

Desert

JANUARY, 1958 . . . 35 Cents





Every building along Virginia City's "C" Street is a house of memories.

HISTORIC PANORAMAS XI

The Comstock Lode

By JOSEF and JOYCE MUENCH

Believed to be the richest single piece of mining property in history, the Comstock Lode in west-central Nevada had a production record of over a billion dollars in gold and silver. From this wealth came great personal fortunes as well as the hard money

which made San Francisco a fashionable city. Comstock dollars also helped defray cost of the Civil War and provided financing for the laying of the telegraph cable under the Atlantic.

At first the silver ore—"blue stuff"—was cursed by the miners because it interfered with extraction of the gold

content. But when its true nature became public knowledge in the 1860s, the rush was on. By 1873 Virginia City, principal city of the bonanza, had a population of 35,000. Almost every sliver of wood, every nail, every fixture in the community on the bleak slope of Mt. Davidson was packed or freighted in over the Sierras.

Today, far from being a ghost town, Virginia City is a popular tourist center — and plans to re-open the long idle Comstock recently were revealed by a mining company.

Virginia City stands on the eastern slope of Mt. Davidson.



DESERT CALENDAR

Jan. 1—Comanche Dances, Ranchos de Taos, New Mexico.

Jan. 1—Deer, Los Matachines or Turtle Dance, Taos Pueblo, New Mexico. Ceremonial dances in several other Indian Pueblos on New Year's Day and three succeeding days.

Jan. 1—Sun Bowl Carnival Parade and Football Game, El Paso, Texas.

Jan. 1-4—10th Annual Arizona National Livestock Show, Phoenix.

Jan. 4-5—Sierra Club Camping Trip to Box Canyon, east of Mecca, Cal.

Jan. 5—Dons Club Travelcade to Casa Grande National Monument and St. John's Mission, from Phoenix.

Jan. 6—Dances and Installation of Governors in various Rio Grande Pueblos, New Mexico.

Jan. 6—Twelfth Night, Burning of Christmas Trees, Raton, N. M., and other Spanish-American Settlements.

Jan. 11-12—Dons Club Travelcade to Flagstaff area, from Phoenix.

Jan. 11-12—10th Annual All-Breed Cat Show, Phoenix.

Jan. 12—Western Saddle Club Gymkhana, Phoenix.

Jan. 12 and 26—Desert Sun Ranchers Rodeo, Wickenburg, Arizona.

Jan. 16-17—27th Annual Arizona National Livestock Show, Phoenix.

Jan. 17-18—Southern Arizona Square dance Festival, Tucson.

Jan. 17-19—Fourth Annual Lettuce Festival, El Centro, California.

Jan. 18—Desert Museum Field Trip to Palm Canyon, from Palm Springs, California.

Jan. 18-19—Tillicum Trailer Rendezvous for Trailer Tourists from Pacific Northwest, Palm Springs, Cal.

Jan. 19—Dons Club Travelcade to Ray-Hayden Mines, from Phoenix.

Jan. 23—Buffalo Dance and Fiesta, San Ildefonso Pueblo, N. M.

Jan. 23-26—Professional Golf Tournament, Thunderbird Country Club, Palm Springs, California.

Jan. 24-25—Annual Western Dance, Clayton, New Mexico.

Jan. 24-26—Dons Club Travelcade to Zion National Park, Las Vegas and Hoover Dam, from Phoenix.

Jan. 25-26—Sierra Club's Desert Peaks Section Kofa Mountain, Arizona, Hike.

Jan. 25-26—Sierra Club Camping Trip to Agua Caliente Hot Springs, California.

Jan. 26—Trek to King's Canyon for Winter Visitors, from Mesa, Ariz.

Jan. 30-Feb. 2—Open Golf Tournament, Phoenix.

Jan. 30-Feb. 2—Open Golf Tourney, Tucson.

Jan. 31-Feb. 2—Parada del Sol, Scottsdale, Arizona.

Month of January—Art Show: "Image of Asia," Phoenix Art Center.



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The Desert Magazine is published monthly by the Desert Press, Inc., Palm Desert, California. Re-entered as second class matter July 17, 1948, at the postoffice at Palm Desert, California, under the Act of March 3, 1879. Title registered No. 358865 in U. S. Patent Office, and contents copyrighted 1958 by the Desert Press, Inc. Permission to reproduce contents must be secured from the editor in writing.

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Unsolicited manuscripts and photographs submitted cannot be returned or acknowledged unless full return postage is enclosed. Desert Magazine assumes no responsibility for damage or loss of manuscripts or photographs although due care will be exercised. Subscribers should send notice of change of address by the first of the month preceding issue.

SUBSCRIPTION RATES

One Year.....\$4.00 Two Years.....\$7.00
Canadian Subscriptions 25c Extra. Foreign 50c Extra

Subscriptions to Army Personnel Outside U. S. A. Must Be Mailed in Conformity With
P. O. D. Order No. 19687

Address Correspondence to Desert Magazine, Palm Desert, California



Old plank road across the Algodones dunes in Imperial County, California.
Photo by Hubert Lowman.

Old Plank Road

By LAURA W. DUNLAP
Santa Ana, California

A splendid highway runs across the waste
Of sand, beside the dunes aloof and chaste,
And one can see the old plank road, forlorn,
Discarded when new concrete skill was born.
Now like a worn out shoe tossed to the side
The old planks lie, remembering the tide
Of slow cars worrying along its way,
Content to dream, with memory dim and gray;
And always when the moon is thin and new,
Some ghostly travelers keep a rendezvous.

ARIZONA, U.S.A.

By EDSSEL FORD
Hobbs, New Mexico

Give me mountains, give me men
Broken and made whole again;
Give me deserts wide as sky,
With men to garden them—or try;
And I will give you back a place
With freedom written on its face.

BUZZARDS

By GRACE BARKER WILSON
Kirtland, New Mexico

The buzzards look from their eerie nest
At a war of things below;
But they wait and watch as the fight goes on
Be the battle fast or slow.

Their eyes are keen and their instincts sure,
And they stay on high until
The strife is done, then down they swoop
To feast on another's kill.

DESERT CHARMS

By ISOLE BAKER
Enid, Oklahoma

In barren soil that never knows the grace of
grass or scent of rose,
Desert charms lie serenely hidden, not
lightly bestowed on those
Who do not seek its beauty rare. It takes
time and patience
To know this dry and bristling land—yes,
even more—reverence.
More tantalizing its allure grows with long
familiarity.
Then any narrow, meandering pathway will
reward your quest for beauty.

Plank Road in the Dunes

By BETTY HARDESTY
Long Beach, California

Out where the desert dunes, relentless, push
Their selfish way along to bury bush
Or cactus, heat wracked hut or feeble road,
A modern highway nudges, seems to goad
The long forsaken remnants of an old
And twisted track of planks. It carried gold
And men with patient beasts across
The soft impeding dunes without great loss
Of time and energy. Disjointed, flung on
end,
Half buried, up side down, these planks still
send
Our thoughts to desert lore and early days.
We feel men's exaltation or despair, their
craze
For wealth which made them willing to
endure
The hardships of dry desert trails; then see
the sure
Advance of progress, ingenuity which beat
The paralyzing dunes with roads of smooth
concrete.

VANISHING TRAILS

By FRED F. BERGER

There are trails that lead to nowhere across
the shifting sands,
But the restless men that made them
searched not for fertile lands.
They searched for high adventure and
dreamed of wealth untold
And the driving force that spurred them on
was the thought of yellow gold.
They climbed the highest mountains, they
sampled the valley floor,
And when they made a strike, they spent it
and searched for more.
Their campfires no longer glitter among the
rimrocks high
And no longer do their silhouettes stand out
in the jagged desert sky.
Cold are the trails that they followed—lost
is the freedom they knew.

THE DESERT

By FRANCES PARKER GRAAF
Alhambra, California

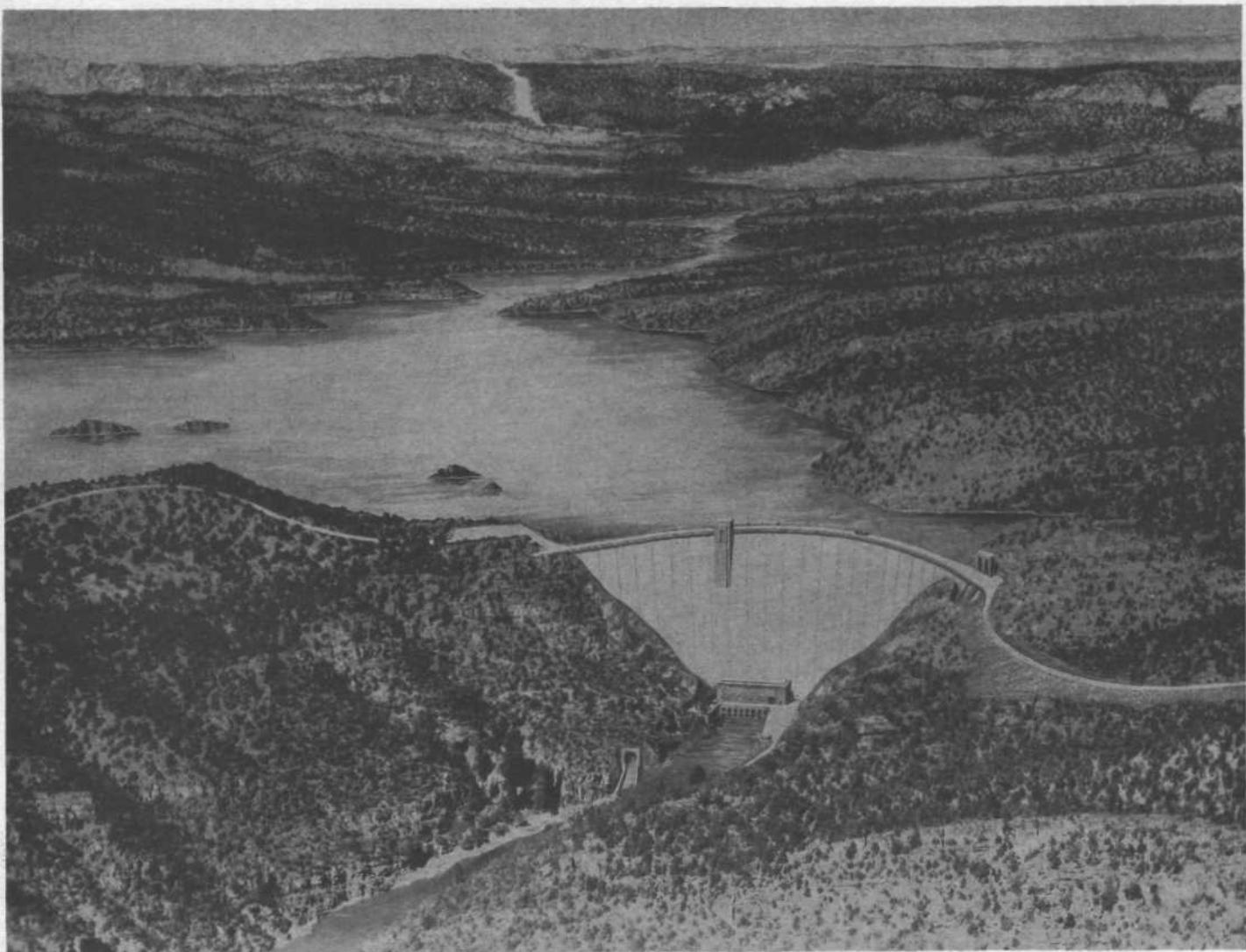
Mysterious desert, vast and ever changing!
Moods mystical, fierce and wild
Or gentle—like the coaxing of a child.
You hold a charm for those who understand
And seek your freedom—bright, enchanted
land!

To resist you is to forfeit all
The fascination of the desert's call.
I claim your gifts, your sunshine, color rare,
Your moods, your peace, your wonderful
clear skies,
And because in all of these I share,
My heart finds home—here where your
promise lies.

Saving Grace!

By TANYA SOUTH
San Diego, California

The Soul is full of corners odd
That tend to deviltry or God.
Ah, but to relegate each sin
Or virtue to its proper place—
That is the strength of Truth within,
And saving grace.



Artist's conception of Flaming Gorge Dam and Reservoir. Photo courtesy U. S. Bureau of Reclamation.

Flaming Gorge Dam On the Green River

By NELL MURBARGER
Map by Norton Allen

EXCEPT FOR doctors, dentists and dime stores, Daggett County in the upper right hand corner of Utah has just about everything one might ask. It even has a couple of towns and a paved road — but the largest of these communities has fewer than 150 inhabitants, and the paved road is only five miles long.

Winding through the county on its way to meet the Colorado River 200

miles down stream is the Green River. And in this high desert region five miles south of the Wyoming border and 20 miles west of Colorado the Bureau of Reclamation has started work on the mighty Flaming Gorge Dam, farthest north storage and power unit of the \$760,000,000 Upper Colorado River Storage Project.

Tentatively scheduled for completion in July, 1963, the \$65,000,000

A new city is rising in the high desert country of northeastern Utah. Soon hundreds of men will begin work on a colossal dam across the Green River. After a million cubic yards of concrete have been poured into the gorge, a lake 91 miles long will be created. Flaming Gorge Dam is still another vital link in the Upper Colorado River Storage Project which is destined to alter the topography, power capacity and recreational opportunities of the Great Basin country.

structure will be the sixth-highest dam in the United States and its reservoir — by backing water 91 miles up the Green — will dwarf in size all natural fresh-water lakes west of the Mississippi.

First leg of my trip to the damsite

was the 175-mile drive from Salt Lake City east to Vernal. All I knew about Daggett County then was that its northeast corner contained the Utah portion of Brown's Hole—a three-state hideout once used by the notorious outlaw Butch Cassidy and his "Wild Bunch," and that this was the locale of the salted mine that figured in The Great Diamond Hoax of 1872 (*Desert*, Feb. '57).

North of Vernal lay the Uinta Mountains which I would have to cross on a dirt road generally closed to auto travel during a large portion of each year, for this range has half-a-dozen 13,000-foot summits and at these

the single diversion tunnel through which the river will be channeled around the damsite during the main period of construction. Twenty-three feet in diameter and 1200 feet long, with a capacity of 20,000 cubic-feet per second, this concrete-lined bore will be plugged upon completion of the dam proper—likely about October, 1961.

Thin-arch in type with a 650-foot radius, the dam will have a length of 1180 feet at its crest, elevation of 6047 feet, will stand 450 feet above the surface of the river—or about 500 feet above bedrock—and will require a million cubic yards of concrete. The

of power is tentatively scheduled for June, 1962, and it is anticipated that the entire cost of the project will be recovered in approximately 50 years through sale of power. At present there are no plans to use the waters of either Glen Canyon or Flaming Gorge dams for irrigation or domestic purposes. However, at some later date, there is the possibility of a tunnel diversion from the Flaming Gorge reservoir to the Uintah Basin.

Jean Walton, top boss on the Flaming Gorge project, is a man well suited for the task at hand. After graduating from the University of New Mexico with the electrical engineering class of 1933, he worked three years with the Bureau of Indian Affairs constructing irrigation and power projects, before joining the Reclamation Bureau. Subsequently he served as project engineer on the San Diego aqueduct; spent six years on the Colorado River's Davis Dam and power plant project; three-and-one-half years with the U.S. Army Engineering Corps in the Southwest Pacific during World War II; and later—under loan to the Australian government from the Bureau of Reclamation—served for two years as an advisor on the Snowy Mountain Hydroelectric project.

Jean Walton was most cooperative. Not only did he answer all my questions freely and concisely, he made available to me an armload of maps, blueprints, diagrams, charts and other material. In our entire conversation we had only one difference of opinion.

Just prior to leaving Jean's office for the damsite, I discovered he had detailed a jeep convoy to see that my old car and I made the trip safely over the mountains to Manila, field headquarters of the Flaming Gorge project. At that point a difference of opinion arose. I didn't need a convoy, but I had to do a tough selling job before he consented to let me go my way alone, as I have been doing on the desert these many years.

Jean pointed out that due to late snows the road still was beset by mud-holes and "soft places." He also warned that in the entire 75 miles between Vernal and Manila, I would not pass a single service station or telephone, and for more than 60 miles would not see even a ranch house.

Before leaving Vernal I took on a full supply of gasoline and water, extra cylinder oil, and had tires, water hose connections, and fan and generator belts checked—precautions I always take before driving in sparsely-inhabited country.

In the course of climbing out of the dry flats and brightly-hued cliffs that edge Vernal on the north, Route 44



Project Engineer Jean Walton, left, and Chief Field Engineer Roscoe Granger at the site of Flaming Gorge City. Photo courtesy U. S. Bureau of Reclamation.

northern latitudes the wiles of winter are not to be taken lightly.

Although it was barely eight o'clock when I called next morning at Reclamation Bureau headquarters in Vernal's First Security Bank building, I was agreeably surprised to find the entire office force hard at work. Jean R. Walton, Project Construction Engineer for Flaming Gorge, proved to be a pleasant young man, friendly and accommodating—and intensely interested in the huge undertaking to which he has been assigned.

Prime contract for the dam, according to Engineer Walton, is scheduled to be awarded next March with work beginning immediately thereafter on

reservoir impounded by this barrier will be long and narrow—its capacity water surface of 42,100 acres extending upstream to within four miles of the small city of Green River, Wyoming. Of the capacity load of 3,930,000 acre-feet of water, all but 230,000 will be usable storage.

Like Glen Canyon Dam, major unit in the Upper Colorado River Storage Project (*Desert*, April '57), Flaming Gorge Dam will be used primarily for river regulation and the creation of electrical energy. At the downstream base of the dam will be located the power plant, consisting of three generating units with a combined output of 108,000 kilowatts. Initial production



Canyon scene in Palisade Park on Route 44 between Vernal and Manila.

deteriorated from a very good road to fair, and around 8000 feet elevation became poor. I could see that later in the summer it would be smooth and dry, but I had arrived too early in the season and the way still was plagued by mudholes. Even where the road was its poorest, however, the country was so beautiful it almost hurt to look at it, and in the big glory of that land I found it easy to overlook

such transient inconveniences as "soft places."

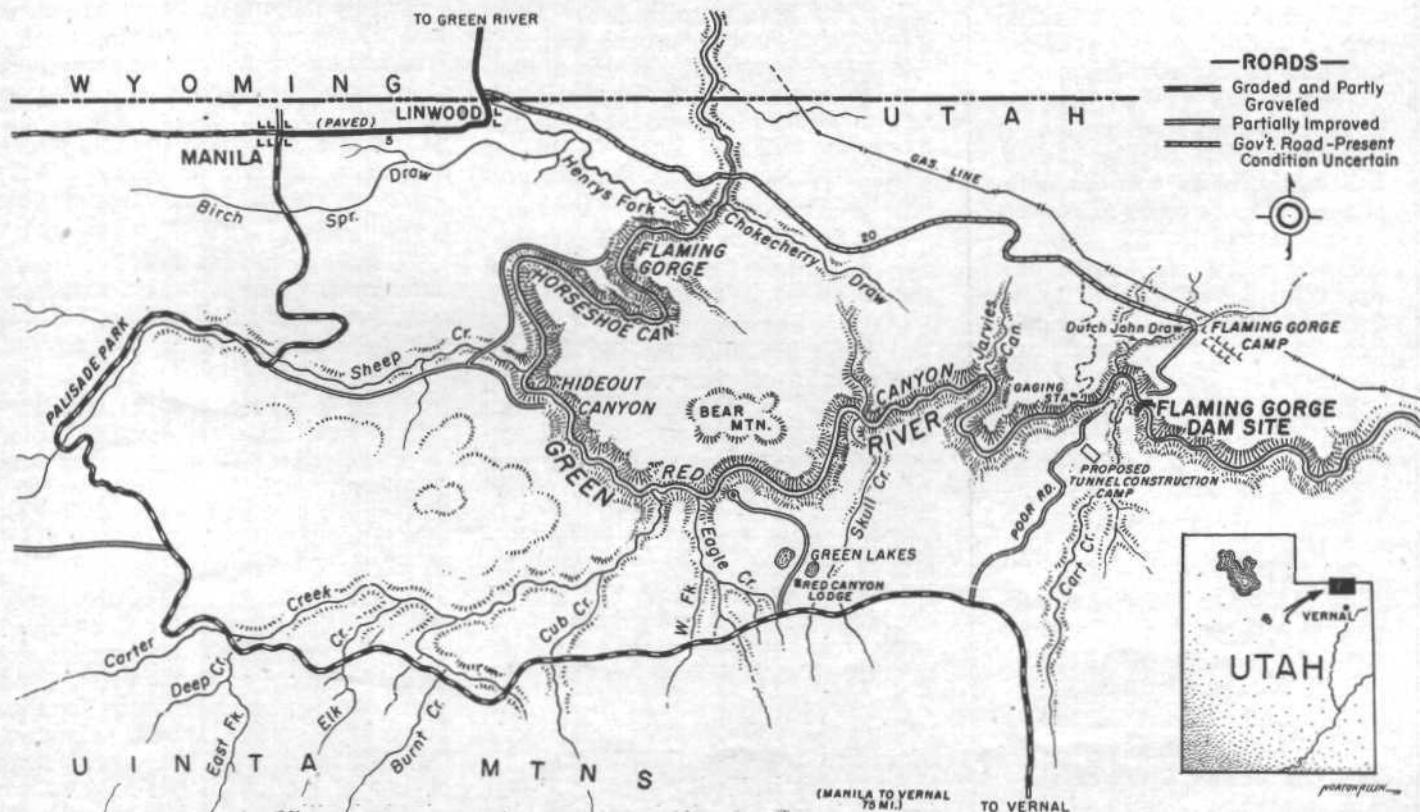
Beyond a wide belt of sage, scrub junipers and nut pines, the road entered a high quiet lonely world where the breeze blew chill and midsummer snowbanks seemed reluctant to leave. Narrowed to little more than a single lane that cleft like a knife through tall still aisles of white pine, fir and pencil-thin spruce, the little road skirted

dense copses of quaking aspen, picked its way through pocket-sized meadows where deer peacefully grazed, and crossed boisterous snow-fed streams that came dashing down from the summits in a roar of white water and icy spray.

I made camp near one of these streams, cooked a good supper and ate it; and then typed as long as daylight permitted. Then I unrolled my



Green River near the mouth of Hideout Canyon. Photos by the author.



sleeping bag on a couch of dry pine needles and retired to a matchless night under the dark sky and the black-velvet silence that spread all around.

Breakfast next morning had been prepared and eaten before the first shaft of sunlight came stabbing into my world, and my first adventure of this new day was the sight of a herd of four large elk which came down to drink at the stream less than 50 yards from where I was breaking camp.

Following the downward course of

FINAL REMINDER TO DESERT WRITERS

The LIFE ON THE DESERT true experience contest ends January 1, 1958. Entries must be postmarked on or before that date.

Here are the contest rules:

No limitation to subject matter so long as the story is set in the Desert Southwest.

Manuscripts should be true experiences, from 1200 to 1500 words in length. Tall tales and heresay stories are not solicited.

All manuscripts should be typewritten and double spaced on one side of the page only.

If 5x7 or larger photographs showing good sharp contrast are available, an extra \$3 will be paid for each used with the story. Pictures are not essential, however.

Writers must be prepared to supply confirmation as to the authenticity of their stories.

True names of those involved must be given, although with the knowledge of the judges, fictitious names can be substituted if there is good reason for doing so.

If the story previously has appeared in print, this fact and the time and name of the medium in which it appeared must be given.

Judging will be done by the Desert Magazine staff and the decisions will be final. Unaccepted manuscripts will be returned if accompanied by return postage.

First award will be \$25. All other stories accepted for publication will earn \$15 for their authors.

Mail entries to:

**Life on the Desert Contest
Desert Magazine
Palm Desert, California**

a deep rocky canyon, the little road dropped rapidly and soon carried me out of the tall timber and back into the highland desert realm of junipers and sagebrush.

Although Manila is the largest town in Daggett County, and the county seat, the 1950 census credited it with only 145 persons. The entire county has but 365 registered voters—about one for each two square miles of territory! Forty years ago this northeastern corner of Utah was part of Uintah County, of which Vernal is the seat of local government. During the several months each year when the high passes are blocked by snow, Daggett citizens found it almost impossible to transact business at their county offices and to remedy this situation the new county was created in 1918.

From a distance Manila is visible only as a grove of green trees that stand out sharply against the gray-brown desert foothills at the far edge of Lucerne Valley. Wide and flat, the valley is checkered with a few small fields and dotted with cattle and horses, and each ranch house is buried in a small cluster of cottonwoods. Rolling on down the grade, across the valley and up the slope beyond, I began glimpsing other houses that seemed to peep curiously from beneath the cottonwoods. At the south edge of the grove stood a small white roadsign that said I was entering the town of Manila, and that it is unincorporated.

Roscoe Granger, field engineer on the Flaming Gorge project, has his office in a nearby trailer park. He is a tall and pleasant man with gray hair—a man 54 years of age who already has 30 years of service with the Reclamation Bureau. He seemed relieved to see me and said Jean Walton had telephoned the previous day concerning my departure from Vernal.

"He figured you might have trouble. Said if you didn't get in, I should send someone to look for you . . ."

At nine the next morning Granger and I left his office for the damsite. Traveling over the only stretch of paved road in Daggett County, we quickly covered the five miles downgrade to Linwood—a tiny trading post village that might have been lifted bodily out of Jim Bridger's day. In addition to a general store building fabricated of logs, a separate log building housed the postoffice. The few old dwellings clustered around these two commercial structures were built of weather-bleached logs roofed with poles and earth.

Linwood, unfortunately, will be one of the first casualties of the dam. When the reservoir is filled to capacity, Manila will become a lakeshore town, but

Linwood will be under 40 feet of water. The reservoir will be nine miles wide and 200 feet deep where the temporary timber bridge crosses the Green near Linwood.

After crossing Henry's Fork River and briefly entering Wyoming, we headed southeast over a good graveled road. Near the confluence of Henry's Fork and the Green River in 1825 Capt. William Ashley's trappers gathered for the first rendezvous ever held west of the Rockies. Some students of history contend that this meeting was held at the junction of the two rivers about four miles southeast of Linwood. Others say it took place farther up Henry's Fork, which heads on Table Mountain 30 miles west of Linwood. In either case, the Ashley Rendezvous was held on Henry's Fork and certainly this region near the river's mouth was well known to many of the famous mountain men who came to harvest the furs of this little-known land.

At the Green River crossing five miles east of Linwood, Granger pointed out the steep north wall of the fiery-hued desert canyon known as Flaming Gorge. The dam whose name is taken from this canyon will be built 25 miles to the southeast, beyond Flaming Gorge, Horseshoe, Hideout and Red canyons. Original plans provided for the dam's location in Flaming Gorge, but when the abutments were declared unsatisfactory, it was moved down canyon to the "Ashley Damsite."

Twenty miles from Manila we came to a 450-acre natural clearing sloping gently to the west. The area was grown to low sagebrush and ringed by small junipers. At the upper edge of the flat stood half-a-dozen portable wooden houses and not far distant a bulldozer was making a great fuss leveling a small rise of ground.

"Dutch John Flat will look a lot different if you come back a year from now," Granger declared. "This is where we are building the city of Flaming Gorge, Utah."

Streets had been laid out and temporary street markers erected. Later these avenues will be surfaced and soft water, ample for all purposes, will be pumped to the townsite two-and-a-half miles from Cart Creek south of the Green River.

At peak of construction, the upper part of the new town will be occupied by 200 government employees and their families, with approximately 1500 contractors' men and their families living in the lower section. Contract for construction of the government portion of the camp calls for erection of 40 dwellings of brick or masonry

veneer, and 40 of frame construction. In addition, said Granger, there will be a large number of "transa-houses" — such as the six already on the ground—plus office and administration buildings, field laboratory, school, repair shop, fire stations, warehouses and a conference hall for meetings and recreational purposes. Also, presumably, there will be stores.

"One of the reasons for selecting this site for the town is that it is only half-a-mile from the Pacific Northwest's natural gas line extending from San Juan County, New Mexico, to the northwestern part of the United States," said Granger. "We've been given permission to tap this 26-inch line, and another break like that wouldn't happen in a hundred years!"

From the townsite we drove the short distance to the end of the road and then hiked through junipers and nut-pines for a quarter mile before coming into view of the canyon area where the dam will be built.

Flaming Gorge damsite does not offer a spectacular view—particularly in a land such as Utah where stupendous scenery predominates so much of the landscape. At the point where the dam will stand, the east canyon wall slopes upward at an angle of about 45 degrees; the west wall is slightly more precipitous. Both slopes are forested with pines. The river was the color of split-pea soup and appeared to be calm and unruffled.

Winding 730 miles from its birthplace near the Continental Divide in Wyoming's Wind River Mountains to its junction with the Colorado River in the wild canyon country 35 miles southwest of Moab, Utah, the Green River ranks 20th in length among the



Typical of the many National Forest campgrounds between Vernal and Manila is this shaded retreat at Red Springs. Many believe dam will greatly enhance area's recreation potential. Photos by the author.

great rivers of America. Historically, it stands far nearer the top of that list.

That a river confined wholly to the mountain states of Wyoming and northern Utah should have been discovered by two Spanish missionaries seeking a direct land route from Santa Fe to Monterey, California, is in itself one of the ironic twists of history. When Fathers Escalante and Dominguez made camp on the Green a short distance north of Jensen, Utah, the American Declaration of Independence had been signed only the month previously.

The Escalante party remained on the river four days during which time the animals recuperated and hunters brought in a buffalo for food. On September 16, 1776, they crossed the

Green—which they named Rio de San Buenaventura—and went on to adventures elsewhere.

Forty years later Capt. Ashley, the fur trader, first looked upon the Green River—which he called Spanish River. In 1832 the wagons of Capt. Bonneville reached the Green. The Bidwell-Bartleson emigrant party crossed this sullen stream in 1841, as did John Charles Fremont in 1843, '44 and '45. Harassed travelers on the Oregon Trail in the mid-1840s, the Mormon pioneers of 1847 and swarming hordes of gold-seeking Forty-Niners also crossed the Green.

But this passing pageant of history is over a century old, and now for the first time the Green River is to be bridled and trained to do man's labor and serve man's need.

Preliminary work on Flaming Gorge Dam is only now beginning, and before the job is completed many months will have elapsed and many difficulties will have arisen.

Problems will stem from the fact that all supplies and most materials must be freighted 60 miles from Green River, Wyoming, the nearest railhead; and work will be complicated by the rigorous climate. Old-timers recall many winters when the mercury has fallen to 30 degrees below zero and blizzard-lashed snow has piled to phenomenal depths.

There will be other problems, too—thousands of them—but each in its turn will be resolved, and all the difficulties surmounted. And one day Flaming Gorge Dam will stand completed, a testimonial to engineering skill and resourcefulness, a monument to man's dreams and determination.

Log Postoffice at Linwood will be inundated by the Flaming Gorge reservoir.



He Carves the Santos--

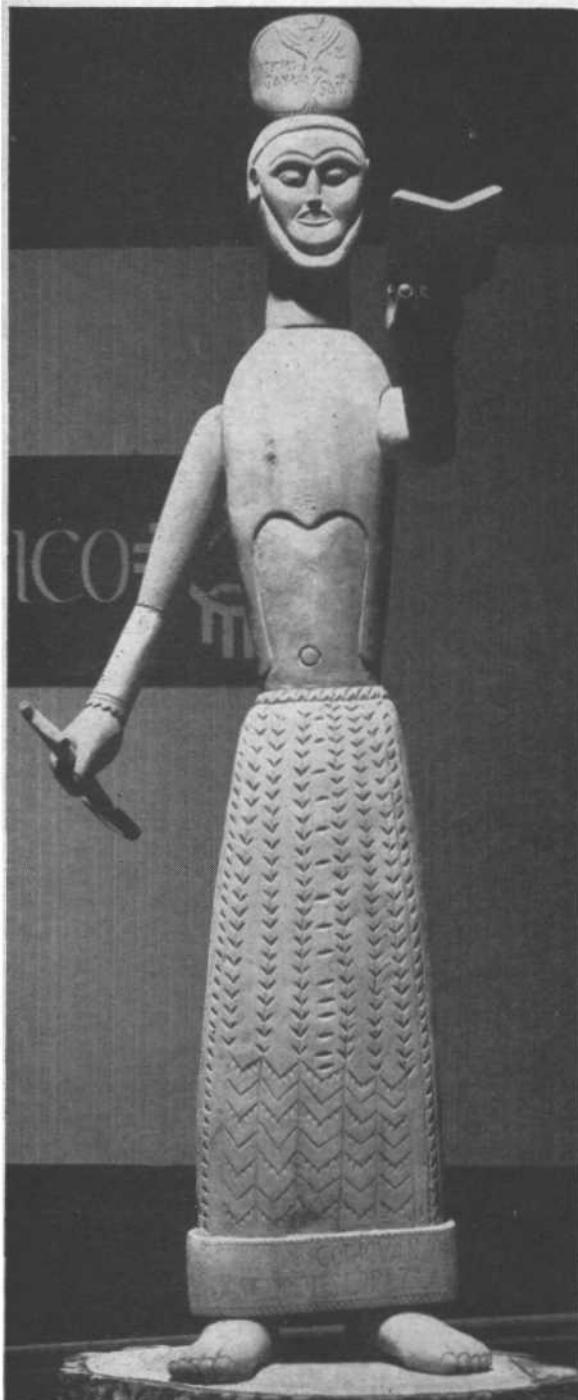
IN THE LAND OF THE PENITENTES

By W. THETFORD LEVINESS

Photographs courtesy
New Mexico State Tourist Bureau

9 FIRST MET George Lopez in Santa Fe. He was selling wood carvings at the fiesta, and at once I became intrigued by his *santos*, jewel

San Pedro.



boxes, animal effigies and the intricate pieces he called Trees of Life. Some articles were whittled out of juniper and cedar, but most of the good ones were of cottonwood. "Cottonwood is softer, and you don't break so many knives," he said. His voice had a strong flavorful accent.

I tried to get him to talk more, but the tourists crowded in. Between sales he invited me to visit him at his shop in Cordova.

Months later my friend Gino Conti of Providence, Rhode Island, was in Santa Fe and mentioned his interest in liturgical art. I told him about George and his delicately carved *santos*, and we were off for Cordova in an hour.

The town lies east of Los Alamos and the Espanola Valley, on the historic Santa Fe to Taos road. It is in the heart of the Sangre de Cristo Mountains and the setting, except for

Best known of the wood sculptors and Santo makers of New Mexico is George Lopez of Cordova, a sixth generation "santero." His forceful Santo artistry represents an intertwining of the influences of traditional Catholicism, medieval Spanish art, the mountain isolation of his 200-year-old village in the Sangre de Cristo Mountains, and perhaps most pronounced of all—the self-castigating Penitente ritual.

electricity in the homes and a paved highway nearby, is that of 16th Century Spain. Cordova's inhabitants are predominantly Roman Catholic; the older ones speak little English. Buildings are of adobe, their tin roofs a symbol of the Americanization which took place when the railroads reached New Mexico. Patron of the church,

George Lopez at work in his shop in Cordova, New Mexico.





Carreta del Muerto.

erected in 1831, is St. Anthony of Padua. Both Protestants and Catholics celebrate a feast day in his honor on June 13.

Soon we found the sign we were looking for: "Mr. George Lopez, Wood Carver, Cordova, New Mexico." He was there with his wife, Silvianita. I introduced Gino and we went inside.

George is one of the last of the *santeros*, or makers of *santos*. The word "*santo*" is Spanish for "saint," but the term includes apparitions of the Virgin and aspects of the life of Christ. Thus, a "Guadalupe" or a "Holy Child" is a *santo* as logically as is a "San Pablo" or a "San Pedro." George's *santos* resemble those once seen in every home, church and chapel in these mountain fastnesses. Usually carved in the utmost simplicity, often they were painted in various colors. During the past few decades, they have largely been supplanted by the plaster-of-Paris statuary available in most variety stores.

Looking around the workshop, we were struck by the humble furnishings

— an old-fashioned wood stove for warmth, a rickety table to display the crafts, and nothing more. A few large carvings stood on the floor along the walls — the three-and four-foot ones destined for church and family altars. George chuckled when we examined them. "When it gets cold," he said, "I can always throw those on the fire."

Silvianita's look of reproach made him chuckle even louder! George Lopez is good-natured and jolly much of the time. He was in his ranch clothes when we arrived for he had been working in the fields since sunup. "We had a good rain last night," he explained, "and I had to plow while the ground was still soft."

He has been a rancher all his life, but for many years worked on the railroad. Since childhood, however, his primary interest has been wood carving.

Born in Cordova in 1900, George grew up a Catholic amid Bible stories and beliefs concerning saints. His father, Jose Dolores Lopez, was a very famous *santero* whose work is in mu-



Head of San Pedro.

seums and private collections in many parts of the country. George's grandfather and great-grandfather also made *santos*, and George is fairly certain that the craft goes back even further in his family. "I'm a sixth generation *santero*," he says, "but I guess I'm the last because I've got no kids of my own."

George left Cordova for railroad work when he was 19. He was on extra gangs and snow crews with the Denver & Rio Grande Western's narrow-gauge lines in New Mexico and Colorado for a score of years; and worked three years for the Union Pacific at Rawlins, Wyoming. He did his carving on lonely nights in the rail camps.

During the war he got a job at nearby Los Alamos and worked there until 1952. For the past few years he has stayed at home, devoting his time to ranching and carving.

"When I'm away all the time," he explained, "there's no chance to make these." He picked up a Tree of Life. "This is a sort of Adam and Eve cre-

ation story," he went one, "—without the snake." He got the idea from a Garden of Eden carving his father once did, showing a serpent wrapped around a tree of forbidden fruit. George does these conventional pieces, too, but likes his own version better. It resembles a diminutive Christmas tree with small meticulously carved bells. Made of separate pieces—as many as 395 in some works—they are stuck together to symbolize the fragile nature of man. The Denver Art Museum has exhibited a Lopez Tree of Life, and George sells many of them to people who want something serious on other than a strictly religious subject.

Gino was fascinated by all this and bought a Tree of Life on the spot. It now occupies prominent shelf space at Penelope Court, the Conti children's art school in Providence.

"I like his animals best," said Silvianita. She pointed to some little pieces about three inches high—burros, sheep, goats and skunks. "George sells them to tourists like hot cakes," she added.

But, George Lopez' position in the art world rests squarely upon the heavily stylized *santos* which he carves. This is the sort of sculpture he sells to galleries and discriminating collectors, and it has made him famous. It is a strange mixture of Catholic tradition, medieval Spanish art, mountain isolation, and *Penitente* ritual. Of all these influences, perhaps that of the *Penitentes* is the most pronounced.

"All my life," George explained, "I've seen *Penitente* processions pass my house. In the old days they'd have a procession when somebody died or even to say prayers at a sick person's home. Nowadays they just have processions in Holy Week."

The Holy Week processions are legendary in Cordova and other villages of northern New Mexico. *Los Hermanos Penitentes* (the Penitent Brothers) are an off-shoot of the Third Order of Saint Francis—a Catholic lay body known for benevolent acts. Members attend the sick, bury the dead, and hold devotional services in localities where there are no resident priests.

There were *Penitentes* in this region from the days of the first European settlement. They grew powerful in the day-to-day life of many communities after the Mexican Congress secularized the missions in 1834. Franciscan padres were expelled and the clergy sent to replace them did not visit the smaller towns very often. The mountain people, at prayer with their *santos* and singing their *alabados* (hymns of praise), kept the faith alive. The *morada*, a chapel with an altar and the barest of furnishings, was the cen-

ter of religious fervor in each community.

Inevitably, extreme practices crept in. Flagellation and cross-bearing, banned by Papal Decree in Europe centuries before, were revived in New Mexico and reached new heights of frenzy. *Penitentes* would lash themselves during Lent with yucca whips. For decades on Good Fridays, mock crucifixions occurred — candidates would volunteer, and one, elected the village *Cristo*, would hang upon a cross.

Some of the Holy Week rites continue to this day. In 1947 His Excellency Edwin V. Byrne, archbishop of Santa Fe, recognized the *Penitentes* as an acceptable group within the church—on condition that their extreme penances be toned down.

George spent his impressionable years in this stoic atmosphere. He smiled affably when I asked him if he had ever participated—and admitted nothing. Secrecy is still the watchword of the *Penitentes*, and membership rolls are never open to outsiders.

The business of making saints, however, is older than New Mexico's flagellants. It springs from the counter-Reformation in Spain, and the works of its three great artist-exponents—El Greco, Velazquez and Murillo.

These painters were at the peak of their popularity when New Mexico was settled, and copies of their oils were brought to the New World. Indians destroyed many of these models in the Pueblo Rebellion of 1680, but after the Spaniards reconquered the area in 1692 an indigenous folk art developed. *Cristos* were represented with bleeding backs—in the *Penitente* tradition but deviating from general Catholic concept. Hand-carved *santos* flourished throughout the periods of Spanish and Mexican rule, and were popular for many years after the American occupation.

Effigies of saints with a particular meaning for New Mexico were seen in abundance. San Ysidro Labrador, with plow and oxen, became the farmer's patron in this arid land; San Ramon Nonato was a special favorite with the *santero*. Guadalupe Virgins were in great demand, and there was hardly a home without its wooden *crucifijo*.

George does all these popular *santos* in addition to many others. He uses only a handsaw, pocketknife and sandpaper to transform a block of wood into a San Juan Nepomuceno or a Santo Nino de Atoche. He doesn't paint his figures; head and limbs are done separately and stuck on the torso without nails.

I noticed that various figures of the same saint were in many respects un-

like. "How do you think up so many versions?" I asked him. He smiled approvingly at Silvianita. "My wife does the designs," he said.

A recent specialty with George is a miniature *carreta del muerto*. Real regular-size "death carts" once were used in the *Penitente* Holy Week ceremonies, and one is now stored in the baptistry of the Church of the Twelve Apostles at Trampas, a mountain village near Taos. George's little carts are replete with wooden wheels and harness tongues. A grim figure of Death, with human hair and deep eyeless sockets, sits in the cart, an arrow poised in her bow to signify an ever-ready willingness to strike. One of the best of these won a purchase prize in "Craftsmen of New Mexico 1956" at the Museum of International Folk Art in Santa Fe.

George took us on a short tour of Cordova before we left, including the church and the *morada*. We saw the *Penitente* crosses, and as the waning sun spread its rays on the distant mountains we sensed the full meaning of the name Sangre de Cristo—Spanish for "Blood of Christ." Gino and I returned to Santa Fe with a new appreciation of New Mexico's Spanish heritage—of its *Penitente* tradition, and of the ancient craft of the *santero*.

SMALL TRACT POLICY CHANGE AWAITS STUDY

The Bureau of Land Management announced that its Small Tract Policy will not undergo possible changes until the House Committee on Interior and Insular Affairs has had time to study testimony received at last October's Southern California hearings.

The BLM's Los Angeles office said a major effort will be made to classify land for lease and sale, and direct sale to applicants who previously filed applications for small tracts. The Los Angeles office will concentrate on the old applications in a renewed effort to wipe out the backlog.

The BLM administers over 12,000,000 acres of public domain land, mostly desert, in Southern California. General policy of making available tracts of from one to five acres will be to give the applicant a choice of leasing a tract with an option to purchase after improvements have been completed, or direct purchase at the BLM appraisal price.

Direct sale also will be made to individuals in groups who organize to meet county development requirements, but no action will be taken to dispose of the large number of terminated lease tracts by public auction or otherwise until the Director of the BLM has conferred with the Congressional committee on this problem.

LIFE ON THE DESERT

Primitive Village in Havasupai Canyon

The isolated Havasupai generally are regarded as the only American Indians who have retained their native culture in anything like its pristine condition. They live in close contact with the earth and their desires are very fundamental ones. White visitors from the fast-paced outside world who follow the 14-mile trail down to the Indian village find here a most refreshing tempo of living.

By ELIZABETH RIGBY

IN THIS hustle-bustle country where just about everyone tries to make the most of any opportunity for financial advancement, it is mildly astonishing to come upon a

group of people most of whom seek nothing in this world beyond the means of a very frugal living.

Such are the Havasupai, People of the Blue-Green Water, who live in a

Only access to Havasupai Indian village is along a 14-mile trail that leads down from the South Rim of lower Grand Canyon.

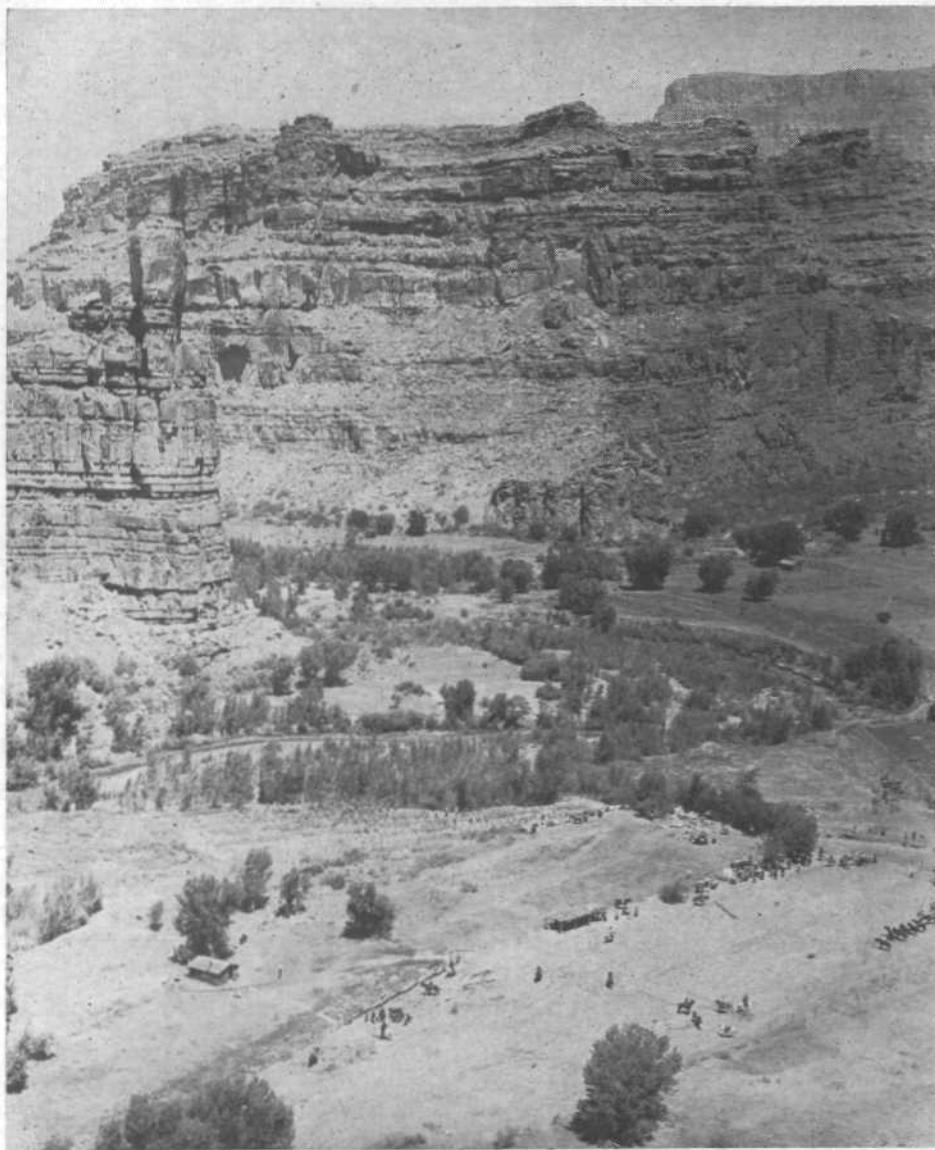
Havasu Falls, 95 feet high, one of three magnificent waterfalls in this remote tributary of the Colorado River near Supai village.



The late Chief Watahamogie, for many years the head man of the Havasupai Indians. Photo by Carlos Elmer.

faraway peaceful valley at the bottom of the Grand Canyon of the Colorado.





Havasu Canyon, inaccessible except by horse trail, where a little band of 200 Supai Indians live in mud and brush cabins and raise enough vegetables and livestock to supply a frugal livelihood. Indian Service photo.

The Havasupai are farmers but they have only a few pieces of modern equipment (among them a community tractor) which were packed down the steep 14-mile trail in pieces. Some years ago when a disastrous flood destroyed many Havasupai hut homes, the United States government provided the settlement with some neat new cottages, American country style. The Havasupai were grateful after their fashion—they used most of the houses to shelter their animals, which are important to them, and built themselves some cosy new mud-and-brush huts.

In their village of Supai there is a new church, a converted Quonset hut that was brought in by helicopter. There had seemed no way to get it down into the canyon, but a group of anxious—and practical-minded—outsiders surmounted the geographic obstacles in businesslike fashion. Now

when the Indians want to use the church for some secular affair they just set up a screen in front of the altar and everything is fine.

Mail is delivered to Supai twice a week—aboard a mule or horse. The village is connected to the outside world by a single telephone, and there is said to be a radio somewhere about. There are no automobiles, of course. Even if you could wing one of these contraptions in, there would only be one place to drive it—back and forth up the single block of the dusty main street. The village's only store, open two hours a day, sells candy, a few staples and a selection of easy cake mixes. I lost my precious pencil on the trail down, and in all Supai I could not buy another.

The Valley, home of the Havasupai for untold centuries, is one of the most beautiful places in the world.

Here is heard only a few sounds—people laughing, horses whinnying, the wind in the great trees, water falling over rocks and the voices of birds and of children playing.

Someone once said, "See the Grand Canyon and die"; but I had not seen the Canyon completely until I visited the Land of the Blue-Green Water in Cataract Canyon. Actually this is a tributary to the Grand and once it was almost inaccessible. Today a few hundred tourists a year find their way down the two trails on horseback or afoot—and practically every visitor wants to send out picture postcards to their friends, for everywhere one turns there is a beautiful picture: spectacular red and white cliffs, crystal-clear blue waters, bright green fields and three lovely falls, two of them higher than Niagara.

Our party was no exception in its collective wish to mail out cards complete with the Supai postmark. In the store they told us that the postmistress might have some for sale. It wasn't mail time yet, but she might be around by and by. We waited. And after awhile she did come—a plump Indian woman, swarthy, slow-moving and smiling.

We followed her into the postoffice and asked if we might see some cards, but she shook her head. "Nope," she said, and disappeared behind the grill.

Thinking we hadn't made ourselves clear we waited and when she re-emerged we tried again. "Picture postcards. They told us you had them here. We'd like to buy some."

As though delighted by some private joke she grinned broadly. "All gone," was what she said.

And still we didn't quite give up hope. Perhaps her card order would arrive in the afternoon mail. "When will you have more?" we asked. "Are you expecting any in the mail today?"

She shrugged. "Dunno."

And then the private joke came out into the open. It was too much for her, too good to withhold, and she looked straight at us, her dark eyes shining, and giggled.

"Didn't order any," she said. And that, we could see, was final.

Now dimly we perceived why she had been so pleased with herself—she had figured out a way to never again be bothered with a silly nuisance. And through my regret came the memory of a storekeeper in a distant industrial town in New England who had ceased to stock the Sunday edition of *The New York Times* because, he told us, "they sell out too fast."

Not all the logic of let-things-be, it appears, abides in Supailand.

Black Agate in Gypsum Wash



Earl Napier points to an agate specimen perched on a gypsum pedestal.

By EUGENE L. CONROTTO

Map and drawing by Norton Allen

IF EVERY AGATE field was like the one Earl Napier and I visited last May, the folks who make prospectors' picks and sore back liniment soon would be out of business.

Here in a broad sandy basin between the Muddy Mountains and Lake Mead, countless hand-sized agate pieces have been "set up" on gypsum pedestals by erosion of the wind. Some of these water-deposited gem stones are perched six inches above the undercut soil so that in places the field resembles a miniature petrified mushroom forest stretching to the pastel-shaded mountains beyond.

Sixty-year-old Earl Napier lives in Boulder City where he and his very pleasant wife, Clara, are putting in full time on the two hobbies that have given them the most pleasure during their lives: rockhounding and boating. I had made arrangements the day before to make this trip with Earl, who advertises in the various hobby magazines a free guide service to the many Southern Nevada gem fields. He is a

This Southern Nevada agate field is unique in that its gem stone specimens are not underground or even on the ground—but perched as high as six inches above the sandy surface on tiny pedestals of soft gypsum. It's an ideal collecting ground for the rockhound with a yen for the unusual and a desire to roam a barren weather-etched basin, following in imagination the footsteps of many now-extinct mammals that once lived in this Ice Age paradise.

partially disabled World War I veteran and much of his life has been spent on the deserts of the U.S.A. as a miner and prospector. Tall, lean and with an ever-present chuckle on his lips, Earl is a fine representative of the rockhound hobby.

At six that morning we started off for the Gypsum Wash agate field which he and Clara discovered a few seasons earlier on one of their desert jaunts.

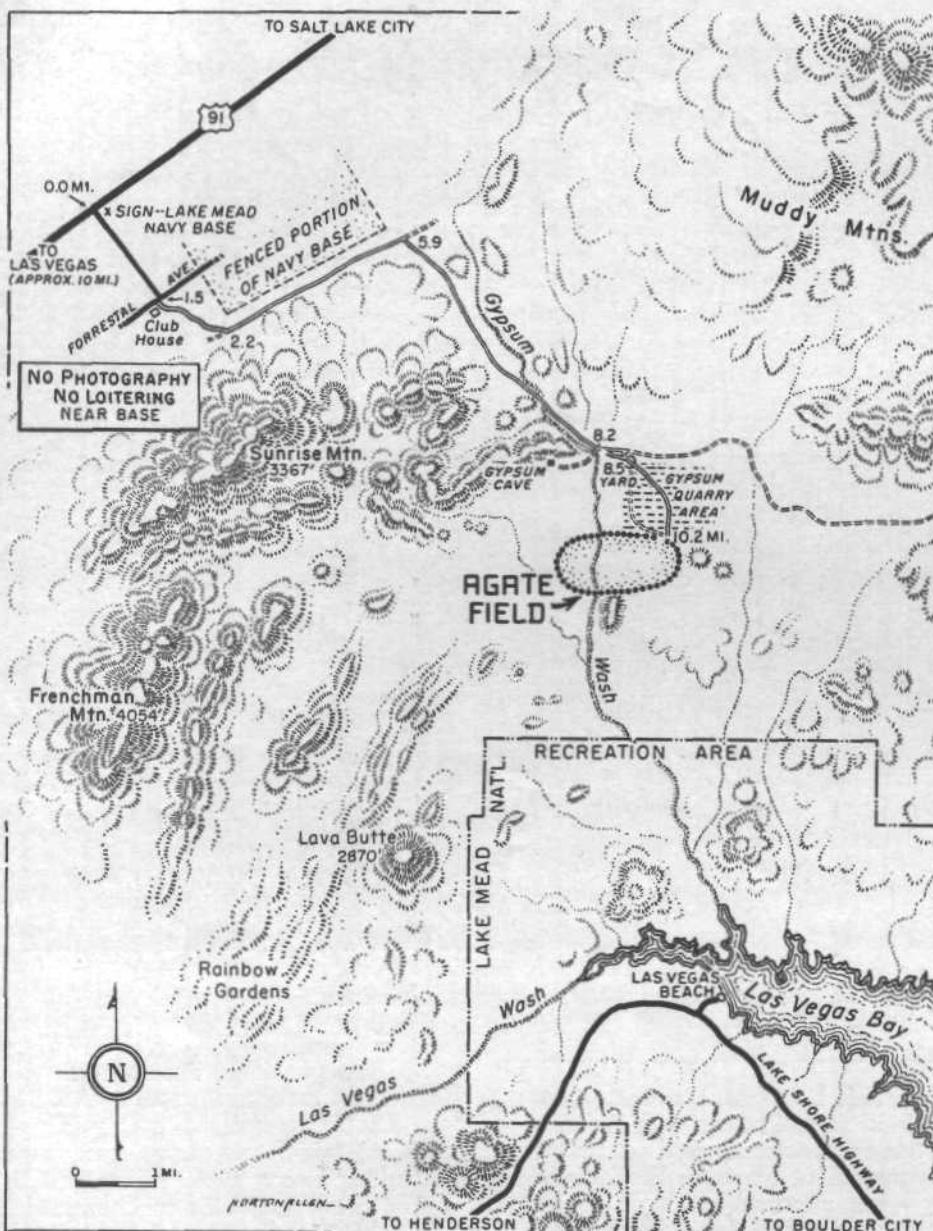
We made the 30-mile drive west-

ward through the industrial city of Henderson, then northward to U.S. 91 (the Las Vegas-Salt Lake City Highway) on which we drove east past Nellis Air Force Base. Two and a half miles beyond Nellis' main entrance is the paved entryway to the Navy's Lake Mead Base, clearly marked by a large blue and white billboard-size sign.

The agate field lies at the end of a road which passes through the Base. While Navy property extends from Highway 91 to within a mile or two of the collecting area, trespass rights are relaxed for rockhounds and prospectors who otherwise would not have ready access to the open country behind the Base.

However, loitering and photography are not permitted on the Base, and this we learned the hard way. I stopped to take a picture and within moments we were arrested by Navy guards.

Two hours later, after assuring the intelligence officers that we did not want to assume our rights under the Fifth Amendment, and explaining our innocent intentions, we were allowed



to continue minus my exposed film. I was given assurance, however, that rockhounds would not be denied use of the road through the Base so long as the no loitering, no photography rules were strictly obeyed.

To reach Gypsum Wash road we turned right on Forrestal Ave. which intercepts the Base entrance road a mile and a half south of Highway 91; proceeded a few hundred feet to the Base hobby shop; and turned left there onto the graded road which travels southeasterly around a high chain link fence encircling the main portion of the Base.

While the unpaved road to the agate field is regularly bladed and readily passable to standard cars, it requires careful driving, especially in the first two miles beyond Forrestal Avenue. Up and down it goes over the shoul-

ders of red-stained Sunrise Mountain, and at the top of these roller coaster rises there is the danger of meeting an oncoming vehicle.

At 5.9 miles from Highway 91 near the southeast corner of the fenced portion of the Base, we turned right at a fork in the road which led down Gypsum Wash. In this sector the wash is a sandy thickly vegetated pass through the rainbow-hued mountains. On the vein-scarred slopes above we counted half-a-dozen ore dumps and prospect pits before the country opened up into a treeless sun-bronzed expansive basin.

Nothing remains at the inactive gypsum quarry 8.5 miles from the highway except a few bits of rusted wreckage, the cement foundation of an oil tank, and acres upon acres of geometrically fascinating white gypsum tailings in long high windrows.

Immediately south of the mine yard and behind the crumbling oil tank base, the wheel tracks lead across a low hump into the weird maze of gypsum tailings. These narrow mounds are piled three times higher than an automobile and separated by avenues broad enough to drive down and seemingly get lost in. Fortunately, however, the main road is twice as wide as the side canyons intercepting it at right angles, and there is no difficulty in following it through the dump area, a distance of a mile and a half. We parked here and climbed over the last white barrier into the agate field in the open desert.

Two strides beyond the bank I plucked my first elevated agate from its sandy pedestal. The specimens in this field tend to the blue-gray and black hues and will take a good polish either as individually worked stones or in a tumbler. The outstanding pieces show sharply contrasting black and white bands, while others are spattered with flecks of bright reds and yellows. These surface-lying stones are visible against the light desert soil for as far as the eye can see and my guess is that a person could walk all day in this general drainage area and never run out of material to examine.

Sparkling on the ground are thumbnail flakes of gypsum crystals. The huge plate-glass crystals, so prized by collectors, are not found here, but along the lake shoreline within the Lake Mead National Recreation Area where collecting is regulated by the National Park Service.

The main portion of the agate field is about two miles north of the LMN-RA boundary. Prospecting is permitted within the Recreational Area and rockhounds who wander into it will not be breaking the law if they pick up a few samples of stones, gems or other minerals. Mining, however, is

Giant sloth. Remains of this prehistoric animal were found in Gypsum Cave near the collecting field.



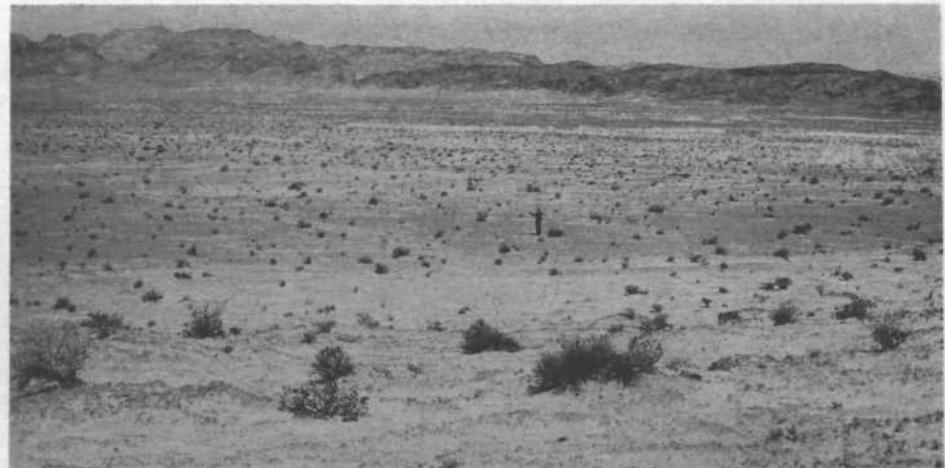
legal only under special permit and any great amount of rock collecting falls under the mining classification, Park Naturalist Philip Welles informed me. Collecting with the intent of trading or selling "samples" also is considered mining.

Surrounding this natural basin on the northeast are the somber Muddy Mountains, on the west and curving southward the barren irregular heights of Sunrise Mountain, Frenchman Mountain, the Rainbow Gardens and the River Mountains. On the lower level of these encircling ridges are the dark burnt patches of lava flows which tell of a more violent past for this region than the calm sunny day we were enjoying.

Nine miles south rose a thin black finger of smoke from the government-operated manganese plant which, along with the nearby titanium and chemical works at Henderson, make this general area an important industrial region in this new age of rare and uncommon minerals and metals. Products ranging from weed killers to guided missile propellants and valued at \$100,000,000 annually are produced here.

Dominating the southeastern vista is dark sphinx-like Fortification Mountain on the Arizona side of Hoover Dam, one of the Colorado River Basin's most famous mountain landmarks.

But, the far vistas did not provide the most thrilling sight on this day, for surrounding us in the agate field and in full bloom was a superb stand of dazzling shiny-leaved sandpaper-plants (*Petalonyx nitidus*). This now very rare shrub has much larger flowers



The main collecting field looking northeast. Muddy Mountains in background. At end of the Ice Age this was a well-watered paradise, the domain of many now-extinct mammals.

than the more common Thurber sandpaper-plant. Its clustered blooms are white and delicately fragrant while the rough-toothed leaves actually shone in the bright sunlight. Usually, shiny-leaved sandpaper-plants do not bloom until mid-summer, but the year was an uncommonly warm one and this May display was an extra dividend.

Drilled into the soft white ground of a nearby slope were a few small burrows, evidence that even in this waterless gypsum-filled basin there is animal life. By contrast, a mile north of the agate field is the archeologically famous Gypsum Cave (*Desert*, November '42), once occupied by *Nothrotherium shastense*, the now extinct squat bear-like ground sloth. The cave was excavated by scientists in fairly recent times and from findings made there has come much of what we today know about the sloth.

Clara and Earl Napier of Boulder City. Large clear gypsum crystals they are holding were collected on Lake Mead shoreline. Napier are avid boating enthusiasts as well as rockhounds.



He was a hairy long-tailed somewhat stupid-appearing animal, measuring eight feet from nose to tip of tail. His strong forelegs were tipped with eight-inch claws which he used to strip the tops of Joshua trees, yuccas and other plant species plentiful here at the end of the Ice Age.

Sharing this once well-watered paradise with the sloth were huge mammoths, camels, giant buffalo, horses, deer, mountain sheep, antelope and elk. Preying on these vegetarians were the flesh-eaters: tigers, wolves, lions, coyotes and a physically weaker creature who lately had added to his chances of survival by controlling fire and manufacturing spear points—man.

Gypsum Cave Man apparently was ignorant of the potter's art, but he was a master at fashioning projectile points from flints and obsidians and it was these weapons that scientists uncovered in the cave in association with the remains of sloths and camels. The distinctive points are diamond-shaped, about two inches long and with small convex stems. What an important contribution to science it would be if more of these points are uncovered in this region by rockhounds!

The cave is a quarter of a mile west of the bladed Gypsum Wash road we came over. The turnoff is at 8.2 miles from Highway 91. Evidence of the excavations and gypsum-lined caverns are the main attractions awaiting visitors to this famous site today.

And now the sun was directly overhead and Earl and I headed back to the car for our canteens, our collecting sacks containing some choice specimens of the black agate Nature had served up to us on tiny pedestals.

Death Valley 49ers Break Ground For \$350,000 Museum

Ground was broken at the 9th annual Encampment of the Death Valley '49ers on November 10 for a \$350,000 museum, financed by the State of California, on a site near Furnace Creek Ranch in Death Valley.

Desert Quiz

This is *Desert Magazine's* school of the desert—a monthly test prepared by the staff to enable our readers to expand their knowledge of the desert country. The questions cover many subjects—history, geography, mineralogy, botany, literature, Indians and the lore of the arid Southwest. Readers will find their scores improving as they read and travel. From 10 to 12 is a fair score, 13 to 15 is good, 16 to 18 excellent, and a score over 18 exceptional. The answers are on page 40.

- 1—In case of a rattlesnake bite, the thing to do first is — Run for a doctor _____. Kill the snake _____. Apply a tourniquet _____. Bandage the wound _____.
- 2—*The Epitaph* is the name of a famous frontier newspaper published at—Yuma _____. Tombstone _____. Death Valley _____. Ballarat _____.
- 3—One of the following desert trees does not have thorns on its limbs—Mesquite _____. Ironwood _____. Catsclaw _____. Smoke Tree _____.
- 4—Butch Cassidy is recorded in history as a—Stage driver _____. Indian Scout _____. Fur trapper _____. Outlaw _____.
- 5—Chief Palma, friend of the white men in the days when the padres blazed the first trails across the Southwest desert was a — Yuma Indian _____. Apache _____. Navajo _____. Mojave _____.
- 6—“Five-spot” is the name of a common desert—Lizard _____. Flower _____. Gemstone _____. Bird _____.
- 7—Telescope Peak is the highest point in the—Sangre de Cristo Mountains _____. Panamint range _____. State of Nevada _____. White Mountains of Arizona _____.
- 8—A metate was used by the Indians for—Killing game _____. Grinding seeds _____. Snaring birds _____. Ceremonial purposes _____.
- 9—The famous Lost Dutchman mine is believed to have been located in the—Wasatch Mountains _____. Funeral range _____. Harqua Hala range _____. Superstition Mountains _____.
- 10—The author of *Death Valley in '49* was—Manly _____. Lummis _____. James _____. Corle _____.
- 11—The Enchanted Mesa is believed to have been the prehistoric home of the—Hopi Indians _____. Acoma _____. Zuni _____. Jemez _____.
- 12—Creosote bush derives its name from—The odor of its foliage _____. The color of its sap _____. The perfume of its blossoms _____. The residue found on the ground beneath it _____.
- 13—Fairy duster is the common name of a desert—Butterfly _____. Flowering shrub _____. Bird _____. Insect _____.
- 14—Nevada's famous Helldorado is held annually at—Reno _____. Las Vegas _____. Carson City _____. Virginia City _____.
- 15—Boron, on the Mojave Desert of California, is a mining center for the production of — Silver _____. Potash _____. Placer gold _____. Borax _____.
- 16—Albuquerque, New Mexico, is on the banks of the—Pecos River _____. Rio Grande _____. San Juan _____. Rio Puerco _____.
- 17—Bandelier was a famous — Archeologist _____. Mountain man _____. Indian scout _____. Apache chieftain _____.
- 18—The Museum of Northern Arizona is located at—Prescott _____. Flagstaff _____. Kayenta _____. Grand Canyon _____.
- 19—Furnace Creek Inn is a famous hotel in—Monument Valley _____. Grand Canyon National Park _____. Death Valley _____. Goblin Valley of Utah _____.
- 20—*Bajada* is Spanish for—A mountain range _____. The sloping fan at the base of a desert range _____. A desert dry lake _____. A deep canyon _____.

This project has been the goal of the '49ers for several years, and was definitely assured two years ago when State Senator Charles Brown of Shoshone secured the passage of a bill appropriating the necessary funds. Since then a special committee of the '49ers headed by John Anson Ford, Los Angeles supervisor, has worked diligently ironing out the difficulties involved in securing a site, and reconciling a program of state-financed construction and National Park Service operation and maintenance. The 50-acre site was donated by Pacific Coast Borax Company.

Plans are being drawn by the architectural office of the National Park Service, and it is expected that construction work will be started during 1958.

A crowd estimated at 13,000 to 14,000 visitors took part in the 4-day Encampment program this year, many of them coming in trailers and others camping out, due to limited accommodations in Death Valley.

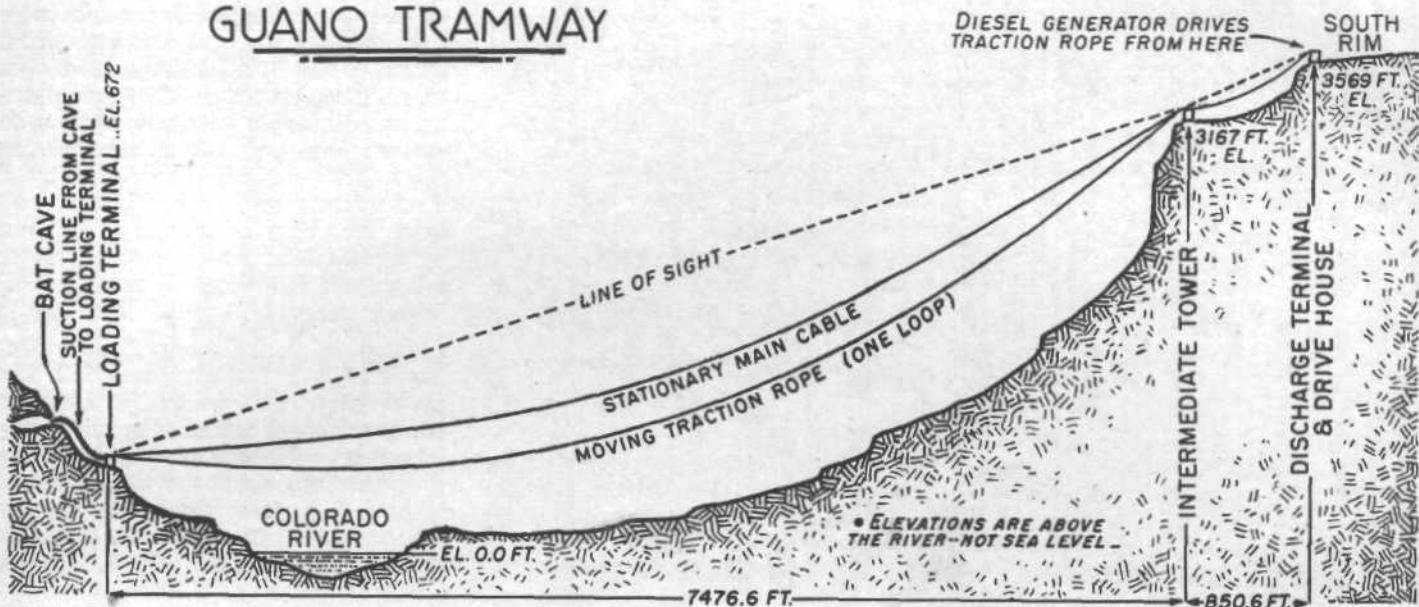
Badwater Bill Fryk of Virginia City won the annual flapjack burro contest. Orpha Klinker with her painting of the late Johnny Shoshone, and Marjorie Cummings with her “Land of Mystery” tied for first place in the art exhibit presented at Furnace Creek Inn under the chairmanship of Artist John Hilton.

This year's program included the dedication of a monument to the Wade family, the only members of the original '49er party who found a wagon route out of Death Valley in the winter of 1849. Descendants of the family were present at the dedication.

The usual Artists', Authors' and Photographers' Breakfast programs on the Furnace Creek golf course, campfire programs each evening, Nature tours conducted by Dr. Thomas Clements of the University of Southern California, sunrise services Sunday morning, a Veteran's Day program on November 11, square dancing, mineral and firearms exhibits, and an old-timers' reunion at Scotty's Castle entertained the visitors during the 4-day Encampment.

The following new officers were elected by directors of the '49er organization to serve for the coming year: Alex Krater, president; Harold Ihrig, first vice president; John Anson Ford, second vice president; Arthur Walker, treasurer; Eugene Hoffman, executive secretary; and Yvette Mayou, recording secretary. The newly elected officers already have started preparations for the 10th Encampment program in November, 1958.

GUANO TRAMWAY



Guano Tramway in Granite Gorge . . .

Impossible to reach by trail from the top of the canyon rim, and uneconomical to export by water and air transportation operating below it, the guano riches of Bat Cave in lower Grand Canyon at last are being reclaimed. A spectacular tramway has been built to lift the guano from out the depths of the Colorado River chasm — and perhaps man has won still another skirmish against the indomitable river.

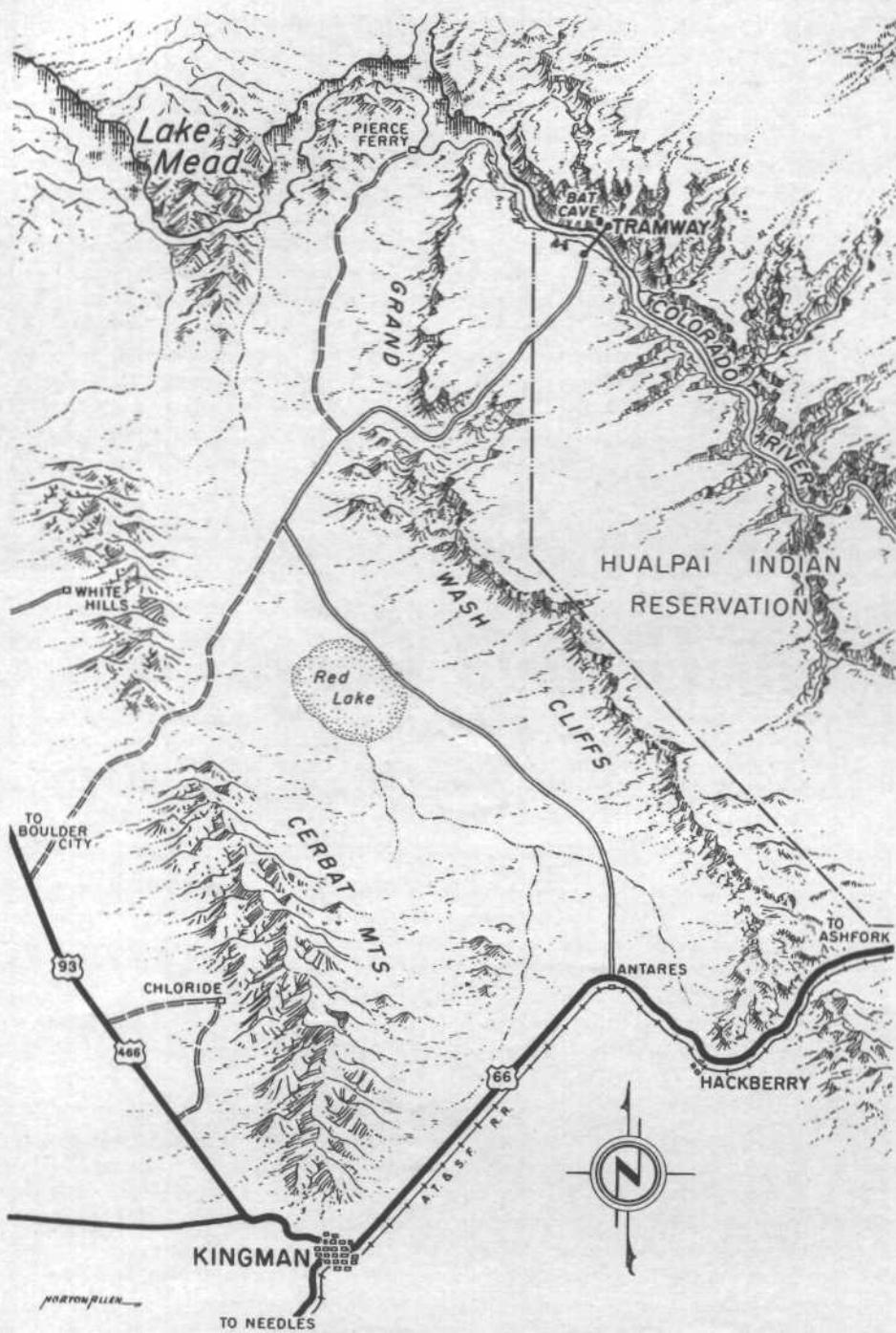
By ROBERT O. GREENAWALT
Map and diagram by Norton Allen

LAST MAY, six miners climbed aboard an aerial tram bucket for its maiden voyage across the precipitous depths of Lower Granite Gorge of the Grand Canyon, 100 miles downstream from the National Park. This new conveyance undoubtedly provides the most thrilling of all possible ways to traverse the Colorado River for it has a horizontal main span of 7500 feet (compared to the Golden Gate Bridge's main span of 4200 feet), and a vertical rise of 2500 feet!

The half-million dollar tramway was built by U. S. Guano Corporation, a subsidiary of New Pacific Coal and Oils, Ltd., Toronto, Canada, to extract the estimated \$10,000,000 worth of bat guano from a cave deep in the canyon. Bat Cave is on the chasm's north wall on a towering cliff face 800 feet above the canyon floor. Since the deposit was discovered and first ex-

Miners making the thrilling ride to work on the cargo bucket. Top cable is stationary; line below it and at bottom is the moving traction rope which makes a continuous loop across the canyon, and propels the bucket.





plored by hardy river-runners in the 1930s, several attempts have been made by boat and airplane to ship the valuable nitrogen-rich fertilizer and pharmaceutical raw material to market. The tramway seems to provide the only profitable way to do so, however.

For thousands of years during the period when the Southwest's climate was more favorable and insect food was plentiful, the cave was the daylight resting place for untold millions of bats. Today, only a few strays are seen near its mouth.

Entire length of the uneven-floored cave has not been explored, but 100,000 tons of the dry brownish guano powder already have been blocked out

for mining. Company officials do not think it is safe to penetrate any deeper into the cave at present. In places the guano is so deep and soft a person cannot walk through it. Cave-ins have added to the problem of reaching the labyrinth's furthest depths. By contrast, some areas of the cave have 100-foot high ceilings.

Recently I visited the tram site and the culmination of a practical idea was faithfully described before my eyes, for the tramway operation is quite simple. The single steel track cable remains stationary at all times and is anchored in solid rock on both sides of the canyon—the northern terminal near Bat Cave, the southern on a point

on the South Rim. Upon this cable rides an eight-wheel carriage from which is suspended a large aluminum cargo bucket with a 3500-pound capacity. Attached to the bucket is an end platform upon which six men can ride. The bucket is propelled by a steel traction rope, a continuous loop twice spanning the canyon and driven by a 100 horsepower electric motor housed on the South Rim.

The northern loading terminal is situated on a small berm 200 feet below the cave entrance and 600 feet above the river. Miners working in the cave shovel the loose guano to the intake of a 10-inch pipe which leads to the storage bin at the tram terminal below. A mammoth vacuum cleaner-type machine attached to the pipe literally sucks the guano out of the cave. The tram bucket is filled from the bin and the cargo carried to storage bins on the South Rim. A round-trip takes a little more than 20 minutes and the bucket makes between 20 and 25 such trips in a normal working day.

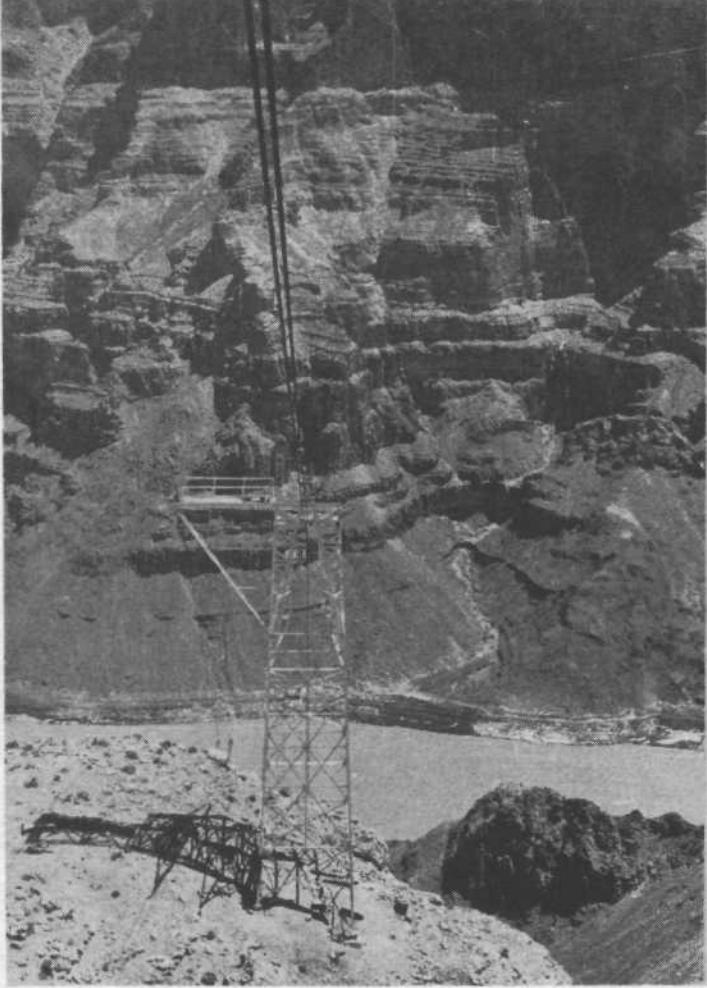
The loaded bucket passes through only one other tower in its 8300-foot run up the South Rim. This structure is located on a bluff 400 feet below the discharge terminal and it is the 7500 feet between the starting point and this intermediate tower across the canyon that gives claim to this being the longest single span tramway in this country and possibly the world.

In order to keep the traction rope taut at all times, huge counterweights are attached to it near the loading terminal. Over 14 tons of loose native rock was gathered by hand and placed in a steel bin within the counterweight tower. This ballast is free to rise and fall in vertical guides, and thus constant tension is maintained in the loop.

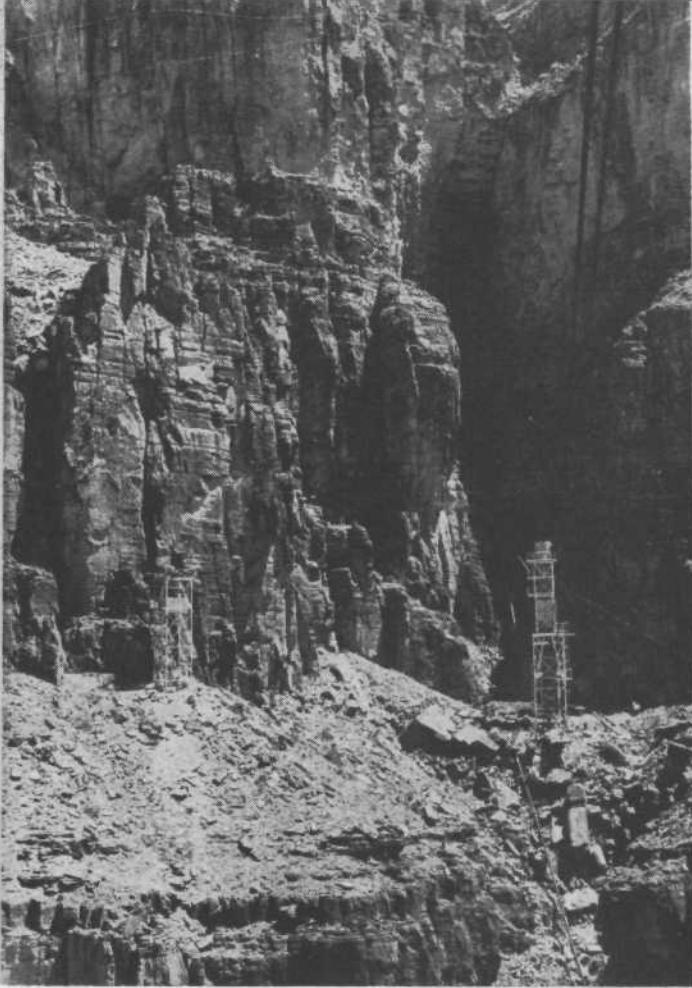
From the South Rim bins the guano is either sacked or bulk loaded onto trucks which haul it to Los Angeles markets.

The operation's 15-man crew has its quarters on the South Rim. Those working on the opposite side of the river can expect at least two exciting rides a day.

The cost of constructing this tramway was markedly increased by the area's isolation and inaccessibility. Since there are no trails from the top of the northern rim to the cave, nor suitable slopes on which one could be built, all personnel, supplies and material for work at the Bat Cave end of the project had to be flown into the chasm. The landing strip was built on a river mudbank a mile from the cave several years ago when air exportation of guano was attempted. Unusually high water recently rendered the land-



Four hundred feet below the discharge terminal, the bucket passes the intermediate tower to begin its long free span across the river to Bat Cave across the way.



Loading terminal is located 200 feet below Bat Cave. Guano is sucked from the cave through a pipe to a bin in this structure. To the left is the counterweight tower.

ing strip useless, but fortunately work on the tram was by then completed.

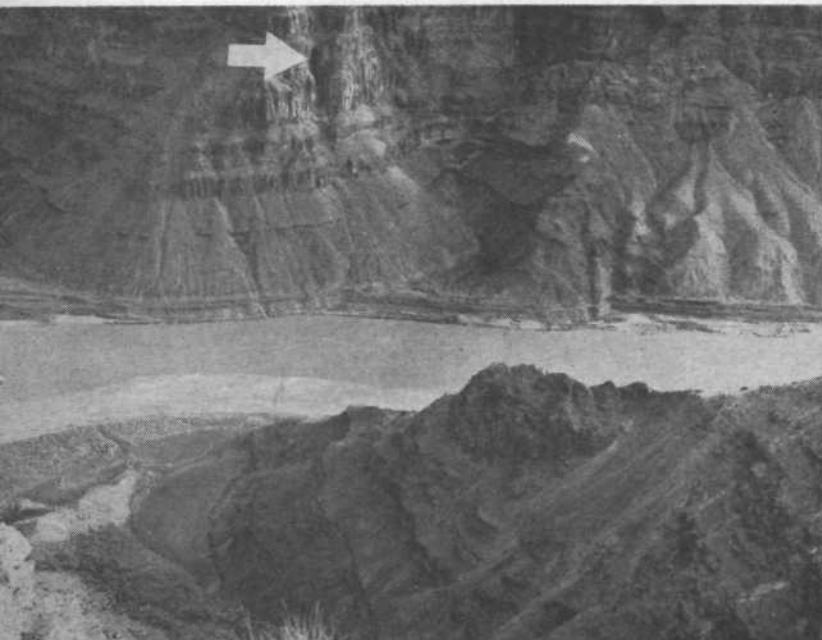
No one knew the air route into the canyon better than did Earl "Buzzy" Westcott, owner and operator of King-

man Flying Service and builder of the river bottom landing field. During construction of the tramway, Westcott made hundreds of flights to the tiny field and brought in the entire 35 tons

of structural steel needed for the job. Pieces were limited to 10-foot lengths and only loads less than 1000 pounds were allowed because of the short runway.

Bat Cave (arrow) as seen from the South Rim before the tramway was built.

View upstream from the bucket in mid-canyon. Air field is on mudbank at left.



Stringing the inch-and-a-half track cable across the canyon was a major undertaking. First step was to lay a one-eighth-inch aircraft control cable from the South Rim to the northern terminal. A helicopter was used for this job. With this line a reel of three-eighths-inch diameter wire rope was pulled across and it in turn was used to pull over a three-fourths-inch rope. The final track cable was then tied to the rope and inched down the canyon. Splicing the track cable off its giant reel was a ticklish operation since such a cable weighs nearly five pounds a running foot. A special reel brake of timbers was built on the edge of the canyon rim to control the unwinding operation.

Bat Cave Tram is 90 miles northeast of Kingman and can be reached by passenger car by turning off of Highway 66 at Antares and driving the dusty graded road to Red Lake, through the Diamond Bar Ranch and past the Grand Wash Cliffs. The road is in good condition to a point beyond Diamond Bar Ranch, but becomes rough as Indian lands are approached. It is advisable to secure permission to cross the Hualpai Indian Reservation by writing to the Agency at Peach Springs, Arizona.

Only vehicles in good condition should attempt this trip for there are no repair garages along the way. Visitors should carry extra water since none is available at the tramway. The company's limited supply is trucked in from Diamond Bar.

Desert Campers will have no trouble finding a spot in which to lay their bedrolls, nor is there a shortage of breath-taking canyon vistas. There are several excellent vantage points from which to trace the almost two-mile long cable to the seemingly minute structures on the other side of the river.

Watching the bucket inch along its spider-web course is one of the most incongruous sights I have ever seen on the desert. It was so unreal at first glance that I had to gaze for several moments before I could completely comprehend what was taking place in the massive canyon.

Thought has been given to selling rides on the tram to tourists after all the guano is removed. Perhaps someday you and I will be able to make this guided flight across the Colorado—and all because millions of bats once chose an isolated canyon cave for their home, and man's genius found a way to tap still another source of riches from the earth.

LETTERS

Faubus and the Constitution . . .

Kreole, Mississippi
Desert:

After many years of being an enthusiastic *Desert* reader, I am sure that your editorial staff is well learned in subjects concerning the Southwest. But this expert knowledge apparently does not extend beyond the boundaries of this territory.

I refer specifically to your mention in the November '57 editorial that "an Arkansas governor calls out the militia to defy the Constitution of the United States . . ."

Since when did court decrees start becoming part of the Constitution without the ratification of Congress? What part of the Constitution did Gov. Faubus defy by calling out the National Guard to prevent violence? Can you cite any Constitutional authority for the President's action in sending troops to Little Rock? I'm sure you cannot.

To many, the real tragedy in Arkansas is not the "defiance" of a governor, but the march of troops on American soil against Americans. Naturally, you cannot realize the full impact of this because it has never happened in your beautiful West.

RUSSELL B. GUNTER

Dear Mr. Gunter—Thank you for your letter. I would not want to live in a world in which all humans were in perfect agreement on every subject—nor would you. It would be a very dull place. Since the days of my youth I have tried to live by a lesson I learned from the man whom I have always regarded as the greatest President to live in the White House during my lifetime—Woodrow Wilson. Quoting from a writer of that day: "He (Woodrow Wilson) could despise men's ideas and yet hold no ill will toward the men who harbored those ideas." And so, because you are an enthusiastic reader of *Desert*, I know you and I have much in common even though we may not see alike on every subject.—R.H.

Screwbean Is a Mesquite . . .

Fallbrook, California
Desert:

Question 16 in your November '57 quiz tripped me up. You say "the desert screwbean grows on mesquite." I lived in Blythe for many years and

it was my belief that the screwbean tree, while a member of the mesquite family, is a distinct and smaller species. The mesquite tree produces large bunches of long beans.

IONA BAKER

Dear Mrs. Baker—You are correct—but both trees are known as mesquites for the botanists have discovered that while they do not look much alike, they have the same basic characteristics. The honey mesquite (*Prosopis chilensis*) produces the straight pods; screwbean mesquite (*Prosopis pubescens*) is the species referred to in the question.—R.H.

• • •

Elmo Proctor's Agate Field . . .

Hollister, California
Desert:

What a pleasant surprise it was to read about the agate field in the Cady Mountains (Nov. '57) which my father, Elmo Proctor, regularly visited in the old days.

We homesteaded 160 acres in the Crucero Valley in 1917 and while several others also took up claims, our family was the only one to live in that area at that time. We gave up the homestead in 1925.

My dad visited his "Jewel Mountains," as he called the Cadys, many times. He returned with agates and geodes for we seven children, and while we longed to go to the field with him, it was too far away to reach on foot. Dad would ride his old horse into the Cadys, and packed his supplies on another. He made his first trip to the agate field in 1920.

Looking for agates that had washed down into the open valley from the Cadys was about the only pastime we children had. Our greatest prizes were tiny geodes, some as large as walnuts, others smaller than peas. Often the crystals within these geodes could be seen through the thinly worn outer shells, and when dropped in a glass of water the geodes would float.

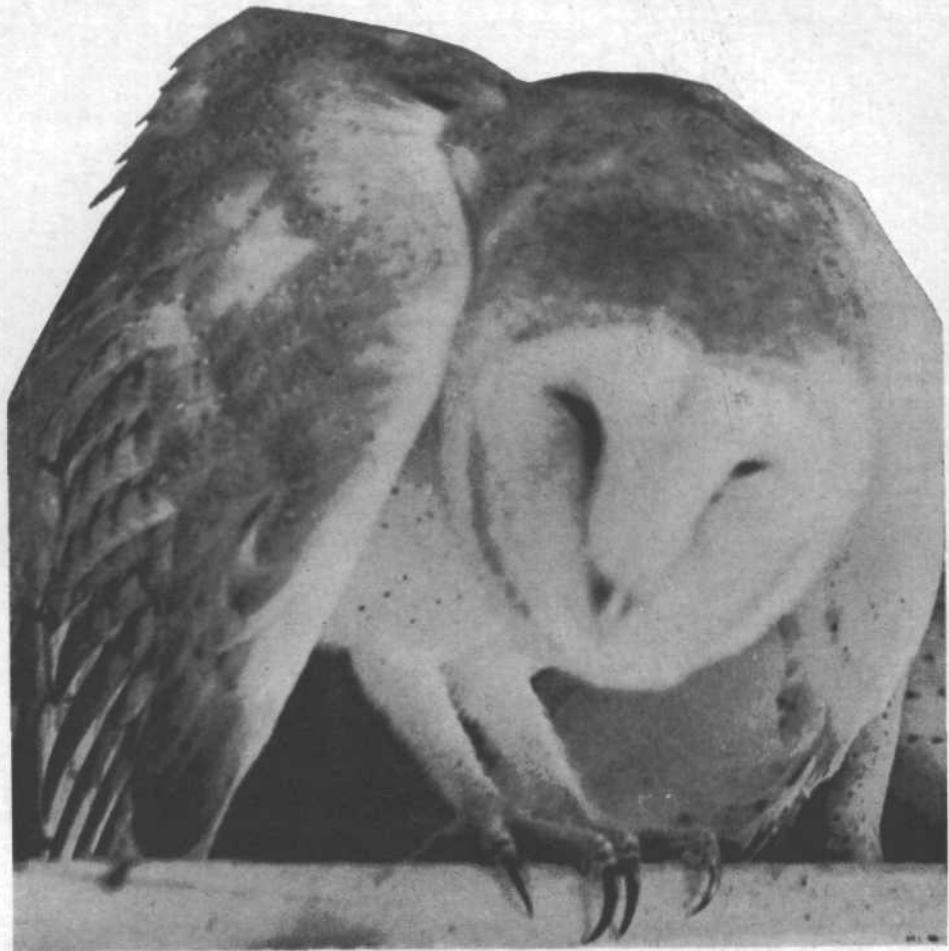
The milk glass Eugene Conrotto described in the Cady story we found by the handfuls, and some of it had quite a bit of "fire" when held to the sun.

I hope some of the rockhounds who visit the Cady field will take time out to look for some of these diminutive geodes in the open valley—and you may stumble across an athel tree surrounded by some weather-beaten boards, the site of our long abandoned, but never forgotten desert home.

MILDRED ROOK

Monkey-Faced Owl

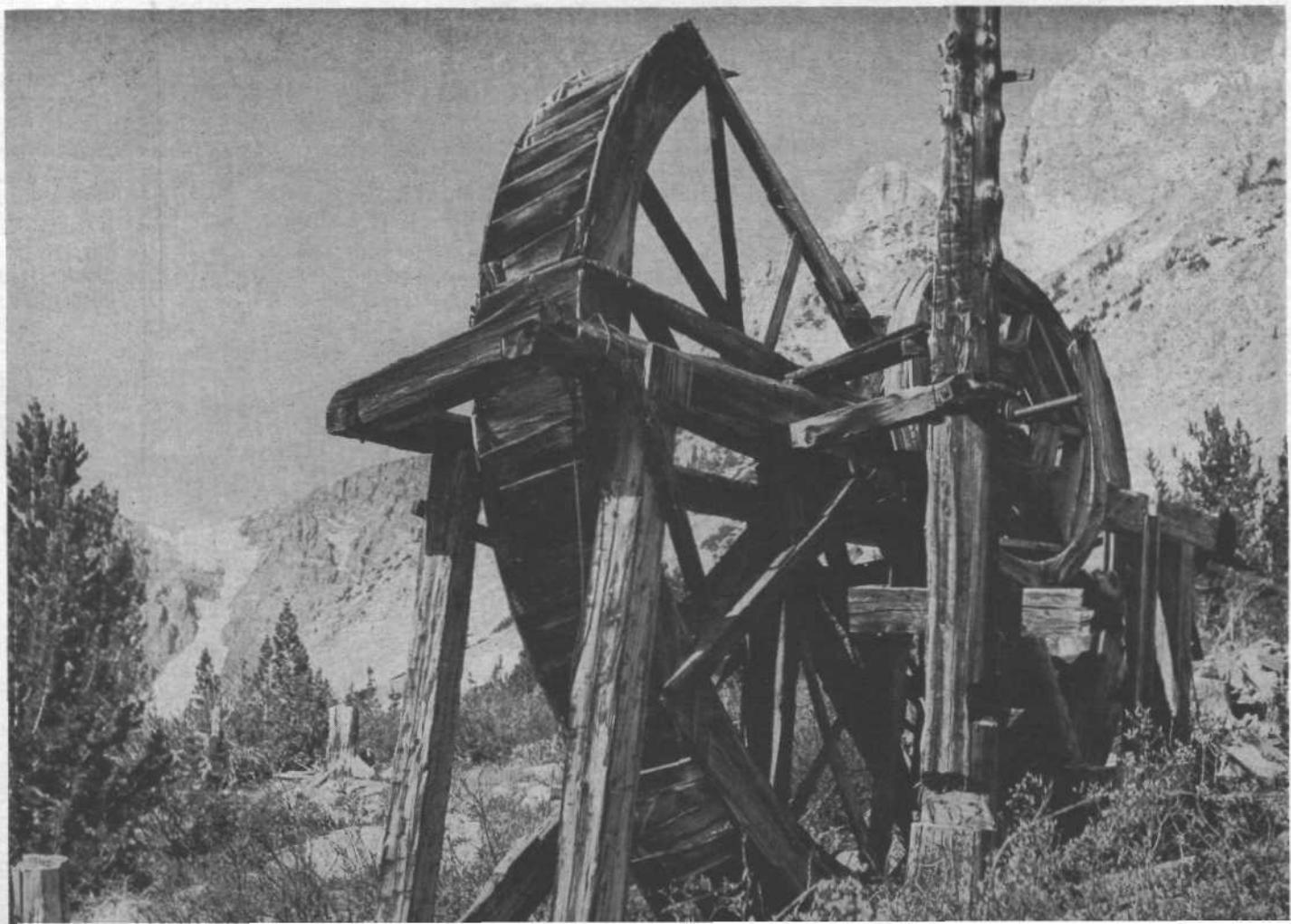
A heart-shaped white face is the distinguishing characteristic of the Monkey-Faced or Barn Owl, a comical-appearing bird to all except the small rodents and insects it preys upon. The Barn Owl is widely dispersed throughout the Southwest. This month's first prize photo was taken by Henry P. Chapman of Santa Fe. Camera data: Rolleiflex 2.8-C camera; Plus-X film; f. 8 at 1/25 sec.

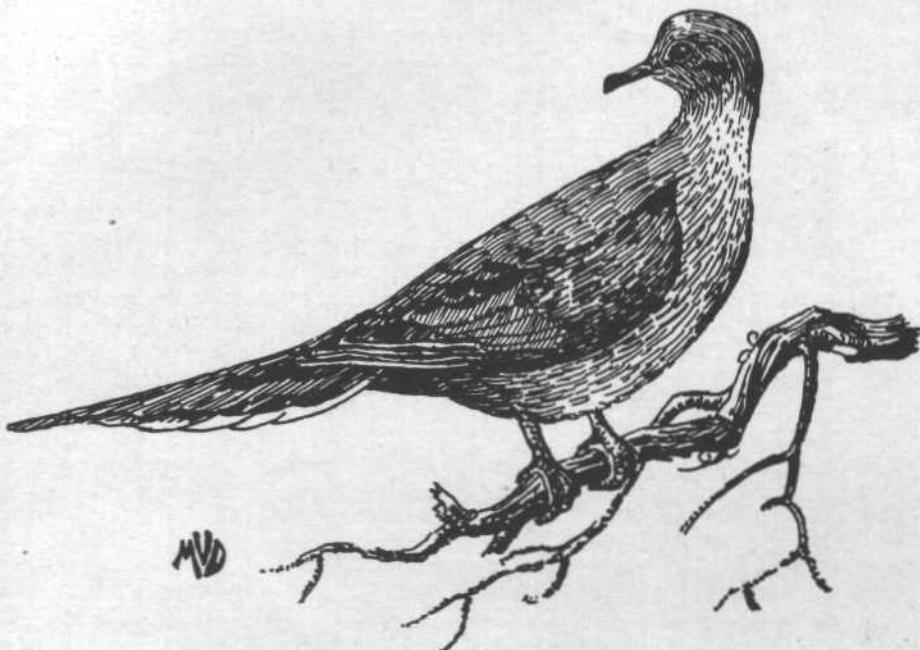


Pictures of the Month

Water Wheel . . .

Louis W. Bruton of Downey, California, was awarded second prize for this photograph of the old water wheel near Lundy Lake in the High Sierras. Short distance above the water wheel is the May Lundy Mine where gold was discovered in the last century. Photo was taken with a Rolleiflex camera on Plus-X film; f. 22 at 1/10 sec.





Western mourning dove.

Doves of the Desert

Only four of the world's 500 dove species live in the Desert Southwest and there is increasing support for the complete protection of these worthy creatures against hunters. Man is learning that not only do these gentle and unobtrusive birds lend aesthetic value to the outdoors, they are also great consumers of noxious weed seeds.

By EDMUND C. JAEGER, D.Sc.
Curator of Plants
Riverside Municipal Museum
Drawings by Morris VanDame

AMAZING INDEED is the fact that while there are over 8600 species of birds, living and extinct, only a relatively few people are acquainted with more than a few of the more common kinds. And even more limited are the number of people who can describe the appearance and habits of even this handful of frequently seen feathered neighbors.

Among the more universally recognized birds are the doves and pigeons—and here we have another startling statistic: they account for over 500 of the total number of bird species on earth! Distributed over most of the world, especially in temperate and tropical regions, at least a third of the known kinds of doves are found in Australia and the nearby islands of the Malay Archipelago.

We are all too often given to thinking of doves as rather dull and uniformly colored birds, but some are

exceedingly handsome with gay colors and spreading ornaments of feathers. Doves also vary greatly in size. The pygmy doves of South America are only six inches long, whereas the gouras of New Guinea are nearly as large as a hen turkey. The extinct dodo was a more than turkey-sized relative of the doves and pigeons.

Four different doves live in our southwestern deserts. The largest is the mourning dove (*Zenaidura macroura marginella*). A mature bird will measure 12 to 12½ inches in length, but its total weight is seldom over four-and-a-half ounces, for much of its bulk is made up of feathers.

This fine unobtrusive bird is not confined to deserts. It ranges into the lower mountain and foothill areas as well as coastal valleys from southwestern Canada to Guatemala. In the north it feeds and nests throughout the summer, then leaves for the south. In

the southwest it is a year-long resident, although even here it is somewhat migratory. In southern Arizona and the Colorado Desert this dove usually is very plentiful during the nesting season of spring and summer. Many of the birds depart for points southward by late September, often to the disappointment of local hunters. In spite of the heavy slaughter by hunters, some mourning doves always remain throughout the winter.

An early sign of spring is the male's soft oft-given mournful song, *ah-coo-roo-coo*—a song heard from very early morning to dusk. Birds which have consorted in flocks in late autumn and winter now break up into pairs. Courtship and nesting begin in May and sometime continue through September. In fact mourning doves have been known to nest in almost every month of the year. As many as five clutches of eggs are produced in a single season.

Last spring I watched a pair of these attractive doves as they courted, built the nest and brooded their young. The nest site was six feet above ground in the crotch of a mesquite tree. The bringing in of the nest material, mostly small sticks and rootlets, was performed by the male in the earlier morning hours between 7 and 10. In choosing the sticks he nervously walked about the ground and picked up one after another, giving each a vigorous shake. Why he selected only certain ones I cannot say. Several times his beak-hold was insufficient and he dropped a twig, but not once did I see him attempt to retrieve one that had fallen.

The twigs were presented to his waiting mate who placed them in position about or under her at the nest site. It took three days of very much delayed work to complete the nest. The interruptions were spent in amorous billing and cooing, what appeared to be very meaningless flights, and feeding on seeds in nearby fields.

The birds often perched on a nearby mesquite limb, and on several occasions I saw a quarrel between the male and an incoming rival. Holding the wings and upper parts arched outward, the two birds would work along the limb sidewise toward each other, then suddenly one would give his antagonist a vigorous side push. This was repeated again and again until the rival was pushed off, gave up and flew away. In the meantime the female sat idly by watching in apparent unconcern.

Finally into the nest, really little more than a loose platform of sticks

and rootlets, two white eggs were laid. Both birds took turns at setting—the male generally at night, the female during the day. If intruding birds came near, it was the male which always flew out to drive them off. Incubation took 15 days. For another two weeks the young remained in the nest and during this time were fed "pigeon-milk" wholly by regurgitation. This food is produced in the parent's large crop which becomes glandular during the breeding season and secretes a milky fluid to moisten the partially digested fluid on which the young are nourished.

When one of the baby doves came out from beneath the parent and begged for food the old bird, presumably the female, allowed it to thrust its beak into one corner of her mouth. After remaining motionless for a few seconds she began a slow pumping motion of the head, her throat muscles twitching violently. This continued for about a minute. As soon as the nestling withdrew its beak, the other hungry youngster came up to take its turn.

Once out of the nest the young were at first very unsuspecting and tame but soon they learned to fly well. Often I saw them feeding on seeds in the open field with the parent birds.

Doves do not scratch the ground

to gather the enormous quantities of seed they daily require. On soil that appears perfectly barren I have seen these keen-eyed birds pick up great numbers of small seeds almost uninterruptedly at the rate of 82 per minute! No wonder as many as 9000 seeds have been found in the crop and stomach of a single bird—a most exemplary record for most of the seeds are those of noxious weeds.

Seeds in a dove's gizzard are ground into minute pieces so that there is never a chance of weed pests being carried to new areas as is the case with some other birds and mammals which digest only the nutritious coating and later discharge the viable seeds.

Almost all ornithologists are defenders of the mourning dove. As a destroyer of weed seeds the bird is far more valuable as the farmer's friend than as a target for the hunter's gun. They would place doves on the protected list of birds valued for their comforting presence, their song and continuous and unquestionable aid to agriculture. The mourning dove is so protected in a number of states.

In spite of their strong powers of flight, doves have many enemies, including hawks, owls and domestic cats. But their greatest enemy is so-called civilized man.

Mourning doves are very dependent on the presence of water. Early in the morning and again near sundown they fly singly, in pairs or small groups to waterholes, streams or canals, often from considerable distances. Gunners all too often take advantage of the thirsty birds as they collect and linger at the water's edge and shoot them down in numbers, a practice not condoned by true sportsmen. During the hunting season enormous numbers of doves, sometimes with helpless young in the nest, are shot. Most reprehensible of all is the fact that many of the birds are not killed outright, but wounded and left to die.

The beautiful blueish-gray white-winged or Sonora dove (*Melopelia asiatica mearnsi*) is not as large as the mourning dove. In contrast to the mourning dove's pointed tail, the white-wing's is squarish, the outer parts white-tipped except on the two middle feathers. A large striking crescent-shaped white patch is seen on their wings in flight, but only a longitudinal white streak shows when the wing is closed.

The white-winged dove is essentially a Mexican species appearing only in a small strip above the international border in California, Arizona, New Mexico and Texas. It is migratory

Three desert doves: white-winged dove, left; Mexican ground dove, in flight; Inca dove, on rock lower right.



and arrives in the United States near the last of April.

"From the day of their arrival in spring," wrote M. French Gilman of this dove in Arizona, "they set up a continual call which may roughly be described as *co-co'-o-cok'-co-co*. This call is heard from morning until night and in such volume that it becomes a sort of continuous bass hum, a background or sounding board for all the other bird songs and calls. It lacks the plaintive tone of the mourning dove's call, and to most people becomes a dreary monotonous droning. Be that as it may, the sight and sound is part and parcel of the mesquite desert and would be sorely missed."

As soon as the young white-wings are mature, all the birds gather in flocks and diligently seek seeds in the open fields; there also are occasional flights to sources of water. When saguaro fruit begins to ripen, the doves greedily feed on this red-pulped delicacy as fast as it matures, and the beak and feathers about the mouth are stained with the red juice.

As late as 1920 rookeries of thou-

sands of nesting pairs were reported from the mesquite hummocks of southern Arizona along the Gila River, but following the clearing of land for agriculture and increased hunting pressure the white-winged dove population has markedly decreased.

The lively little Inca dove's (*Saragossa inca*) metallic *coo-a-coo'* with strong accent on the last syllable is heard throughout the year in Pimaland of Arizona and far south into Mexico's arid brushlands. The notes become louder and more earnest sounding as the season of courting and nesting approaches. The confiding but quick-mannered birds are frequent dwellers about ranch yards and enjoy nothing better than an opportunity to feed with the chickens or to perch upon backyard clotheslines or fences. And when the time for nesting comes they so often build in trees near human habitation that they are regarded as town and small pueblo dwellers. They are common about Tucson "where they are accounted either exceptionally tame or exceptionally stupid, for they seldom take flight until almost trodden upon," reports Dr. Leon Hausman in

his indispensable *Encyclopedia of American Birds*. "These birds are the world's most persistent and indefatigable lovers. Hour after hour a pair of birds will sit on a branch or telephone wire, and coo tenderly to each other."

I quite agree with many that the Inca dove is "the cream of the dove family." Its neat feathered coat is unusual in that each grayish brown feather ends in a semi-circular dusky edge giving the bird a decided scaled appearance. The brown and black tail is long and pointed with white outer feathers which are conspicuous when the bird is in flight. Legs and feet are flesh color to carmine-pink.

Smallest of our desert doves is the dainty, unobtrusive and reticent Mexican ground dove (*Columbigallina passerina pallescens*), found only along our arid southwestern borders, Baja California and the Mexican mainland south to Guatemala. Like the darker-feathered eastern ground dove, often it is a familiar bird about human habitations, cultivated fields, groves of trees and thick brushlands. Seldom is it seen in the open desert where it must nest and rear its young near water. As its name implies, it is much given to moving about on the ground where with quick dainty steps and uplifted tail it walks, repeatedly nodding its head as it progresses. When disturbed, it makes a short direct but jerky flight to cover.

Most pleasing are its soft cooing notes, mournful but never depressing. For hours at a time "the long drawn out woo," generally coming from trees or other high perches, is heard. These doves are good ventriloquists and one may think that the male is calling his mate from far away when actually he is very near.

Last July I found two Mexican ground dove nests, both six feet above ground in mesquite trees growing along a canal. Unlike the more flimsy stick nests of most doves, these structures, made of coarse grasses, rootlets and a few twigs, were matted into rather firm platforms with shallow cup-like depressions in the center. Each was about five inches across and one had two eggs in it, the other one.

This sociable little bird has many enemies, among them foxes, opossums, skunks, domestic cats, snakes, hawks and owls. Too small to be valued as a game bird, nevertheless it is shot by hunters who, not finding larger game, use it for target practice along with roadrunners and the small song birds. I am glad to record that there is much sentiment for the complete protection of ground doves.

Cash for Desert Photographs . . .

We are anxious to bring to our readers the best of desert photography—and each month two cash prizes are given to the photographers—amateur or professional—who send us these pictures. No other place on earth offers more distinctive camera subjects than does the desert where practically every day is one suited for the taking of pictures. Our easy to enter contest is a natural outlet for your desert photos. Any subject will do, so long as it is of the Desert Southwest.

Entries for the January contest must be sent to the Desert Magazine office, Palm Desert, California, postmarked not later than January 18. Winning prints will appear in the March issue. Pictures which arrive too late for one contest are held over for the next month. First prize is \$10; second prize, \$5. For non-winning pictures accepted for publication \$3 each will be paid.

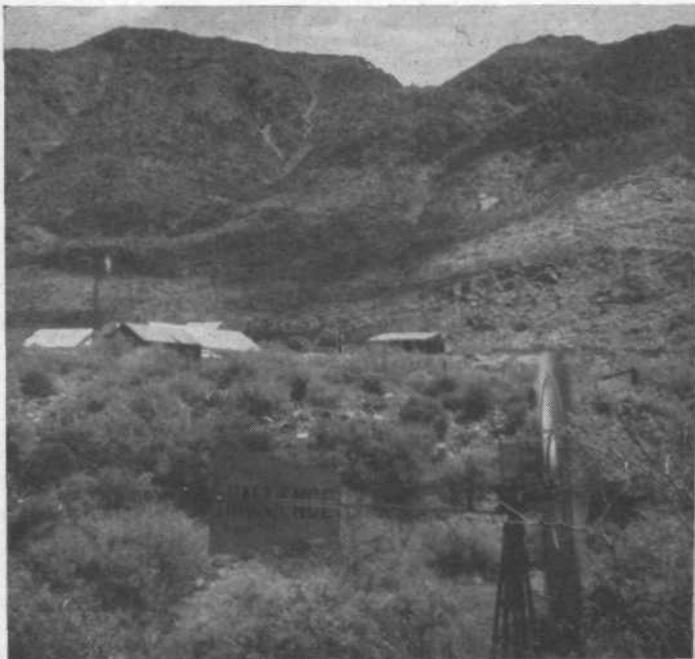
HERE ARE THE RULES

- 1—Prints must be black and white, 5x7 or larger, on glossy paper.
- 2—Each photograph submitted should be fully labeled as to subject, time and place. Also technical data: camera, shutter speed, hour of day, etc.
- 3—PRINTS WILL BE RETURNED WHEN RETURN POSTAGE IS ENCLOSED.
- 4—Entries must be in the Desert Magazine office by the 20th of the contest month.
- 5—Contests are open to both amateur and professional photographers. Desert Magazine requires first publication rights only of prize winning pictures.
- 6—Time and place of photograph are immaterial, except that it must be from the desert Southwest.
- 7—Judges will be selected from Desert's editorial staff, and awards will be made immediately after the close of the contest each month.

Address All Entries to Photo Editor

The Desert Magazine

PALM DESERT, CALIFORNIA



Stanton, with Rich Hill in Background.



The author examines a Rich Hill nugget.

I Found Gold on Rich Hill...

Millions of dollars in gold were taken from Rich Hill since initial discovery of this famous Arizona placer field in 1863. William ESENWEIN's belief that additional wealth awaited the modern prospector willing to search Rich Hill's rugged flanks recently was confirmed when he made a promising strike in a deep gorge draining the mountain. Here is the story of that discovery and of the mountain which gave him and others before a chance at fortune.

By WILLIAM ESENWEIN
Map by Norton Allen

NUGGET-STREWN Rich Hill in west-central Arizona has dealt fortune to scores of men. Like some of them, I came from a distant land in answer to the call of gold.

On my 23rd climb to the top of this deserted bonanza I still had not found the wealth I felt others had overlooked. Surely this massive mountain of pre-cambrian granite, cracked and pitted by titanic forces, had hidden away some treasure beyond the grasp of passing pioneers.

This possibility seemed more certain each time I plodded the arduous trail to the top, and on this last trip I discovered virgin placer ground whose inaccessibility had defied repeated searchings by generations of men.

I owe the strike to the antics of a cougar and a pack rat.

The cougar, attracted by the smell of meat, peered in the door of the cabin I was staying in on top of Rich Hill, and quickly disappeared. I put

some food outside and watched for him to return.

Meanwhile, a pack rat ate the rest of my already depleted food supply, providing me with the strangest blessing in disguise that ever led a man to gold—an empty stomach. Instead of returning to Stanton by the long winding summit trail, I decided to save time by short-cutting over the western escarpment of the mountain.

By late afternoon of the next day I completed my first quarter mile of descent into a deepening gorge piled high with tier upon tier of boulders which crunched and gnawed one another as they contracted in the cool of evening.

A long drop landed me on a shelf of gravel spotted with hematite in greasy-looking irregular chunks and worn cubes, some pieces in settings of quartz.

Gold was written all over this ground, and no tailings or stacked

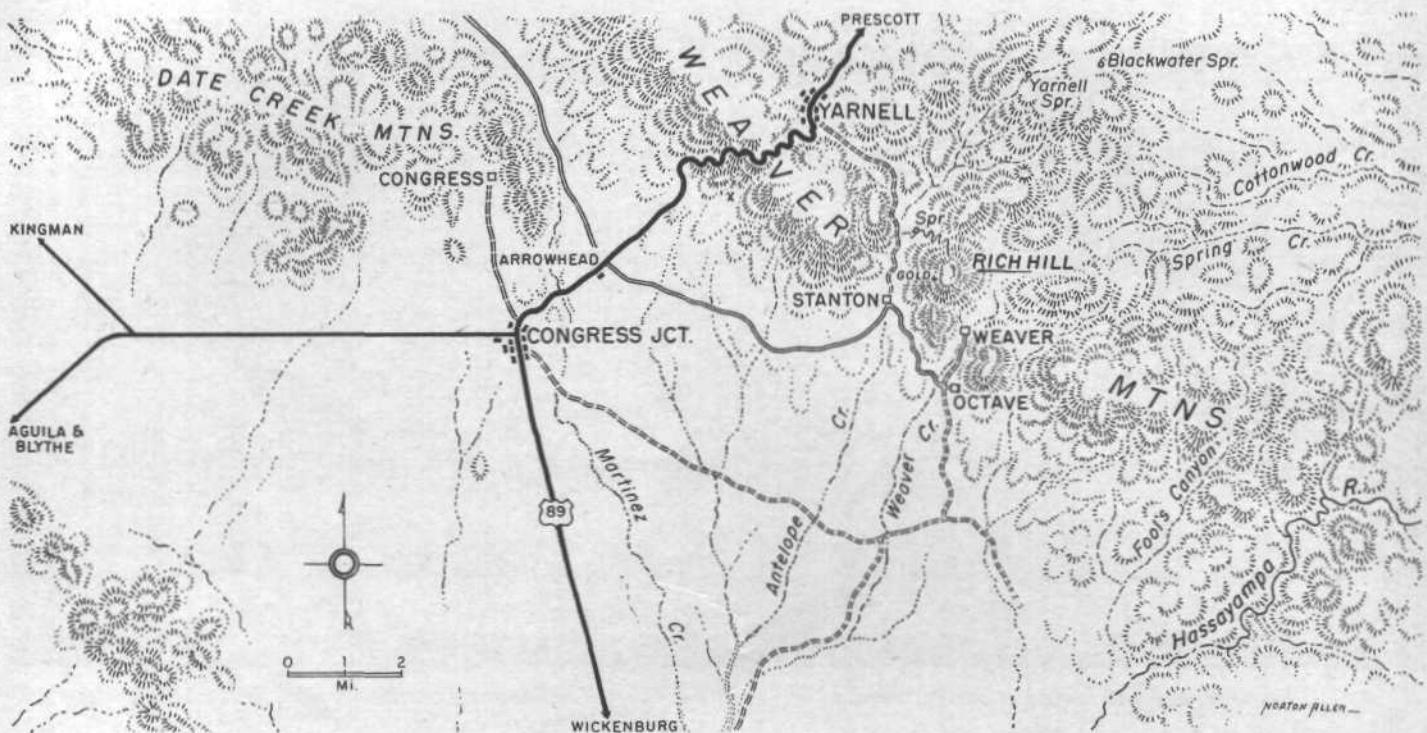
rocks betrayed earlier workings. For lack of water I dry-panned a bit of top sand, finding enough color to justify more thorough testing when I got back to camp.

Descending the cliffs was slow work, but crawling under a quarter mile of catclaw was even slower. The short-cut took three times longer than the trail.

Back in Stanton I found that the samples from the ledge were richer than any surface material I had worked in the gold-laden jungles of South America, where I had prospected for 19 years.

Tales of the geological paradox of Rich Hill have circled the globe since this placer ground was discovered in 1863 by a group of California prospectors known as Peeples' Party. Mountain man and guide Pauline Weaver had joined them at Yuma and it has been hinted that Weaver previously visited this region and observed formations indicating the presence of gold.

Three prospectors of the original party discovered the cache atop Rich Hill while looking for a runaway horse. Not expecting to find gold so high on the mountain, they had left their pans behind. They probed the gravel with hunting knives, each man averaging about \$600 a day before returning to the main party with their news.



Peeples, knowing where to look for likely concentrations of the free gold, picked up \$7000 in nuggets before breakfast on his first visit to the top.

After the prospectors had skimmed the cream of the nugget crop, a rising tide of outlaws flooded in. They built up the communities of Stanton, Weaver and Octave in the foothills of the Weaver Mountains below Rich Hill. The communities are about seven miles east of Congress Junction.

There was much violence in these towns and fights were frequent. Straying into the wrong camp often was tantamount to committing suicide. This state of affairs continued until an Army detachment moved in to quell the disorder.

Today only a few shacks stand in the once-flourishing town of Weaver, and virtually nothing remains in Octave. Stanton has had a better fate. Under the protective custody of Mr. Upton and his niece, Maureen Sanborn, its antique hotel and saloon remain largely intact.

This region, born in a cocoon of gun smoke, is today a peaceful paradise for half-a-dozen inhabitants sent here to die by doctors long since dead. These people all have gold fever, and with it the hopeful outlook without which one is neither a prospector nor healthy.

The nearly-lost trail to the top of Rich Hill leaves Stanton's back road to Yarnell at a point one and three-quarter miles north of Stanton and across Antelope Creek from the only cottonwood trees and tin shack in this vicinity.

Half a mile of easy going ends at the year-round spring where stand the crumbling walls of a rock cabin whose roof collapsed on me during an earlier stop. In the shadow of the cabin lies an old arrastre for grinding gold-bearing ore.

The trail from here requires more careful study, for it winds and zig-zags up the mountain. Burros, which transported such heavy things as cast iron stoves and barrels of water to the top, required this gradual but twisting route.

Constant use at one time kept the trail relatively unobstructed. Today, masses of desert holly intercept it, and rocks and boulders along the way totter on eroded and undercut foundations. In some places the trail is worn waist-deep, in others it disappears entirely.

Just beyond the half-way point the site of a former resting station commands a magnificent view of the desert valley below. From here the summit is marked by a huge boulder, guarding the gate to the "potato patch," so-called because of the size of the nuggets found there in abundance by the original prospectors.

Sight of this rocky sentinel reminds me that I am near the top, but the last quarter-mile is an extremely tough climb.

Over the battlement rim lies the basin of the mountain top, where the secret of Rich Hill's gold is buried—perhaps forever. In times long past, the irregularities in the basin bedrock trapped the heavy nuggets which somehow had found their way to the summit, just as today the same irregular-

ities catch and hold the finer gold. After hard rains, a teaspoonful of black sand concentrate from certain V-shaped traps may contain a dollar's worth of the metal. This content was once so high that the gold of the basin literally overflowed into surrounding canyons.

Two shacks on top have survived the rigors of the elements. One is a photographic study in rock. The other is of corrugated iron, well-preserved when I saw it eight years ago, and still standing today although its roof has been bent back by winds of hurricane velocity.

Crossing the top is Rich Hill's great mystery, a river-bed of granite where the largest nuggets were found. Field rocks here were stacked into walls which resemble the remains of ancient dwellings, so that a maximum of workable ground could be exposed by the miners. This field yielded an estimated million dollars in recorded gold. To this can be added another million stashed away and stealthily removed. Returns from other parts of Rich Hill are not included in these figures.

"Rich," as it is affectionately known to the dwindling number of old-time prospectors, lived up to its name with paydirt so valuable a man's claim was the circle he could mark off with his shovel while standing still.

Six years of placering on this mountain have convinced me that this legend is no myth, and that much wealth remains undiscovered. Most untouched deposits, such as the claim I staked in the gorge and named The Aurora,

require the sure-footedness of mountain goats to reach.

Since my discovery I have made six trips to my glory hole, and have plotted countless strategies for removing the gold. So far I have been unable to work the gravel at the site itself. I am always too exhausted from the incredibly difficult task of reaching it, and too hungry or thirsty to stay very long.

My alternative has been to make quick trips and bring back as much ore as I can carry. The returns on surface material have averaged a dollar a pan in fine gold. They increase at least a dollar a pan for every foot of depth. Small nuggets and coarse gold are found at three feet where clay-cemented gravel begins to show.

The depth to bedrock is uncertain, but I estimate it to be about 10 feet. Thus my 20x30 foot ledge will yield close to 6000 cubic feet of workable gravel, barring many boulders.

The nuggets on bedrock will decisively influence the total value of the discovery. I expect them to be very large, and plan to get them the hard way, inch by inch and trip by trip.

Experience has cast doubt upon the feasibility of other methods. I once carried a dry-washer up the long winding trail. Its remains can be seen in the top of the tree where it landed as we came over the cliff.

I am not tempted to try this again because the difficulty of getting drinking water to this barely accessible spot reduces actual working time to a minimum. Once last summer I drank a gallon of water on my way to the top and was so thirsty upon reaching the shelf that I went on down without even stopping.

Rich Hill has more than gold. The finest gem garnet I ever found came from here. Black sand from the top, speckled with translucent yellow grains, is highly radioactive, and similar material from various parts of the Weaver Mining District assays from \$80 to \$2000 a ton in gold. Also there is scheelite in commercial quantities, and a highly mineralized vein of pegmatite running into the hill on the Weaver side.

This is only scratching the surface. The Rich Hill region represents a compact bundle of possibilities for the aspiring prospector of today.



Top—Stone shack on Rich Hill.

Middle—Part of the stream bed in the "potato patch" on top of Rich Hill. Rocks were stacked to expose as much of the ground as possible.

Bottom—The old hotel at Stanton.

Here and There on the Desert . . .

ARIZONA

Solar Symposium for Youth . . .

TEMPE—The world's first Junior Solar Symposium has been scheduled for March 1 at Arizona State College, Tempe. Sponsored by the Association for Applied Solar Energy and the Arizona Junior Academy of Science, the symposium will provide an opportunity for students below college level to take part in a scientific meeting. Participating students will submit entries consisting of an exhibit and a paper describing the research study upon which the exhibit is based. Entry deadline is February 12 and application blanks may be obtained from the Association for Applied Solar Energy, 3424 N. Central Ave., Phoenix.

Parker Land Deal Unchanged . . .

PARKER—The Department of Interior by late November had not taken any action that would indicate what the government is going to do in the

increasingly complex land deal involving Stanford W. Barton who contracted to lease 67,000 acres of Indian land near Parker. Barton is seeking an extension of time to allow him to post a \$5,000,000 bond. Meanwhile, a former partner of Barton's, Ralph J. Pomeroy, filed a \$6,500,000 suit asking that 90 percent of the stock in Barton's land company be turned over to him. Pomeroy claimed Barton had broken an oral contract they had entered, under which Pomeroy was to manage the deal and arrange financing.—*Yuma Sun*

Park Tourist Visits Rise . . .

PHOENIX — Number of tourists visiting the 19 Federal parks and monuments in Arizona in the first nine months of 1957 increased 13.5 percent over the preceding year's visitor total. Comparative figures were 4,904,800 to 4,312,500. Grand Canyon drew 986,000 in 1957 compared to

894,000 in 1956; Petrified Forest attracted 598,000 visitors in 1957, 525,000 in 1956; Organ Pipe National Monument 288,000 to 284,000; and Montezuma Castle 134,000 to 112,000.—*Phoenix Gazette*

THE *Desert* MAGAZINE CLOSE-UPS

Being an enthusiast of desert lore, a long-time member of the *Desert Magazine* family of readers and an active participant in Sierra Club activities, Civil Engineer Robert O. Greenawalt of Rosemead, California, tells us that for many years he has wanted to contribute a feature article to *Desert*, but was delayed because he felt his knowledge was limited on the subjects at hand.

This month Greenawalt has come up with a story, "Guano Tramway in Granite Gorge," which satisfies both the requirements imposed by his engineering background, and the desert setting. He had close contact with the design of the unique tram which spans the Colorado River at a point between Grand Canyon and the upper reaches of Lake Mead.

* * *

William Esenwein, whose story, "I Found Gold on Rich Hill," appears in this month's magazine, spent over 19 years in Brazil, most of it in the jungle with the Indians.

There he lived, unarmed and unequipped, on terms of friendship with the natives and wildlife. "The only creature that ever attacked me was a civilized man, greedy for the diamond that I carried for striking fire," wrote Esenwein of his fascinating experiences which he hopes to publish in book form.

In 1941, the eastern branch of the Bororo Indians, tired of seeing Esenwein sleep on the jungle floor, built him a furnished hut. His principal occupation was study of the flora, fauna and minerals.

He has a standing offer to go into any jungle in the world without arms or equipment to prove that, without mental or physical provocation, no jungle creature will attack a man. "Jungle carnivores never starve and never resort to eating man unless man has provoked them indirectly by killing off the smaller animals that are the carnivores' normal food. I have never killed an animal in the jungle. For meat I use whatever the natives might have on hand," he added.

Esenwein's mail address is Box 1371, Wickenburg, Arizona.

Hard Rock Shorty of Death Valley



Hard Rock Shorty was in a talkative mood, and the dudes lolling on the leanto porch in front of the Inferno store were making the most of it. They plied him with questions and Shorty always had an answer that amused them.

"The laziest man I ever know'd was slower than a sand dune on a calm day," Hard Rock was saying.

"Pisgah Bill an' me found this feller sittin' in his old jalopy which looked as if a flock o' 17-year locusts had nested in it fer two seasons.

"We asked him where he wuz goin'. 'Nowheres,' he said. 'Don't need nothin' so why should I be bustlin' around lookin' fer somethin'. Got a can o' water an' a box o' eggs. Yu don't need much to eat and drink if you don't move much,' he splained.

"I seen he wuz parked right in the path o' one o' them marchin' sand dunes, an' I warned him he'd better not stay there too long 'cause a big wind storm'd bury him.

"Let 'er march,' he says. 'If camels and tortoises can live buried in the sand, so can a superior bein' like man.'

"Me and Pisgah figgered we'd done all we could fer the crazy galoot, and we went on an' left him sittin' there with his box o' eggs. It wuz five weeks before we came back that way agin, an' there wuz that same good-fer-nothin' sittin' in the same spot where we left him. That sand dune had marched right over him and wuz jest leavin' an the ol' feller wuz shakin' the sand outta his hair.

"He told us he wuz glad things happened the way they did. He'd had a nice long rest. He'd proved that man is as good as them hibernatin' things like turtles, an' that box of eggs had hatched out the finest batch o' fluffy little chickens yu ever seen — which wouldn't 'ave happened if he had et the eggs in the first place.

"Sure beats gallopin' around the country,' he says."

Page Postoffice in Operation . . .

PAGE — Postal facilities were inaugurated at Page, townsite of Glen Canyon Dam, on October 27, birthday of the late John C. Page, former U.S. Reclamation Commissioner for whom the town was named. The post-office is located in a temporary commissary building. — *Nevada State Journal*

Little Colorado Bridge . . .

CAMERON — Under construction is a new \$700,000 bridge spanning the Little Colorado River just north of Cameron. The existing bridge was judged not strong enough to stand the gaff of a constant line of heavy trucks which will be transporting materials from the Flagstaff railhead to the Glen Canyon Dam site. — *Arizona News*

Park Tunnel Opened . . .

TUCSON — Recently opened to the public was the 160-foot natural history tunnel of the Arizona-Sonora Desert Museum. The tunnel, which is an animal habitat, will give visitors a chance to see the secrets of the desert life underground. — *Phoenix Gazette*

To Study Indian Economics . . .

WINDOW ROCK — A three-man economic seminar committee—representing industry, commerce and agriculture—has been appointed by the Arizona Commission on Indian Affairs to aid state tribes in planning development programs. Upon the request of any Arizona tribe, the new committee will arrange seminars on specific economic problems—utilizing the services of persons particularly well-versed on the problem being explored. On the committee are Thomas S. Shiya, banker; Murray S. Gelber, manufacturer; and John M. Jacobs, farmer. — *Mohave County Miner*

Ruins Excavation Slated . . .

CAMP VERDE — The Museum of Northern Arizona at Flagstaff revealed plans to excavate prehistoric Indian ruins near Camp Verde this winter. Amateur archeologists will be given the opportunity to help in the project. The Museum said this will give novices an opportunity to learn basic techniques and also enjoy a chance for an unusual experience. The Museum will display a representative collection of material uncovered from the project, probably at the Fort Verde Museum and other local institutions. — *Verde Independent*

CALIFORNIA

Developer Buys Salton Land . . .

SALTON SEA — Purchase of more than 19,600 acres—30 square miles—for development of a new California city on the Salton Sea was announced

by M. Penn Phillips. In 1954 Phillips, in a comparable operation, purchased 23,000 acres at Hesperia and carried out a land development project which now has a value of over \$50,000,000. The Phillips Salton Sea property is on the west shore, about 25 miles south of Indio. He plans to build a seaside resort community, to be known as Salton City, in order to "exploit the tremendous water sports possibilities of Salton Sea." — *Indio News*

Glamis Road Work Slated . . .

EL CENTRO — Imperial County has set July 1 as the target date for completion of the 16½ mile section of paved road across the sand hills and desert to Glamis, first step in providing a direct paved route between the Imperial and Palo Verde valleys. In addition to the \$660,000 appropriated for the road by the Navy which closed the Blythe-Niland road that passes through its gunnery range, Imperial County has authorized another \$180,000 to complete the work. — *Palo Verde Valley Times*

Navy to Close Mojave Base . . .

MOJAVE — The Navy announced plans to transfer activities of the Marine Corps Auxiliary Air Station at Mojave to Vincent Air Force Base at Yuma, Arizona. Thus the Navy will save over \$81,000,000 in previously proposed modernization costs that would have been required for continued operations at Mojave. The transfer is expected to take place during the first half of 1959. — *Mojave Desert News*

Roadside Rest Stops Opened . . .

BARSTOW — California's roadside rest program was initiated this winter with the opening of the first three "pilot model" units. All three are located on U.S. Highway 66 between Barstow and Needles. The state hopes to build approximately 400 roadside rest stations in the next five years. The present model includes a picnic ramada with a roof sheltering four picnic tables and two refuse cans. In desert areas, in the absence of shade trees and water to maintain them, this type of shelter is considered necessary. — *Barstow Printer Review*

Mojave Horse Trails Mapped . . .

BARSTOW — State and county officials are assisting the local chapter of the State Equestrian Trails Association in the mapping of horse trails on the Mojave Desert. Planned are trails from Barstow to the Nevada line, Death Valley and Palmdale. The system would connect with the State Riding and Hiking Trail at Palmdale. — *Barstow Printer-Review*

Sandblast Controls Sought . . .

INDIO — Eventual control of the wind-propelled sand and gravel that is causing hundreds of thousands of dollars a year sandblast damage to vehicles using the Highway 99 freeway from Thousand Palms to Garnet was indicated at a meeting recently held in Indio. State and County officials were told that right-angle plantings of fast-growing tamarisk along both sides of the 10-mile danger strip, and the irrigation system necessary to keep the growth heavy, would cost an estimated \$400,000. For more immediate relief, barriers similar to snow fences may be given consideration. — *Coachella Valley Sun*

NEVADA

National Park Support Mounts . . .

ELY — The Nevada Chamber of Commerce Executives Association passed a resolution in support of the movement to create a Great Basin Range National Park in the Wheeler Peak-Lehman Caves area in eastern White Pine County. Also supporting the park was the National Highway 50 Federation, with representation in 10 states. — *Ely Record*

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MAPS

SECTIONIZED COUNTY maps — San Bernardino \$1.50; Riverside \$1; Imperial, small \$1, large \$2; San Diego 50c; Inyo, western half \$1.25, eastern half, \$1.25; Kern \$1.25; other California counties \$1.25 each. Nevada counties \$1 each. Topographic maps of all mapped western areas. Westwide Maps Co., 114 W. Third St., Los Angeles, California.

REAL ESTATE

MORONGO VALLEY Highlands. Near Palm Springs. A nicely built furnished and decorated home by owner and son. Living room, two bedrooms, den, bath with shower, dinette-kitchen, back porch, 21-inch television, deep-freeze, refrigerator, G.E. stove, 20 x 20 foot garage, 12 x 12 foot shop, barbecue, rock "work shop" and much more. Superb scenery every direction. No fog. Deal includes 1957 GMC truck, 4-speed transmission with "Borg" campertop, 1956 jeep with "Ramsey" 4-ton winch. Very attractive price. Write Dunn, Box 202, Morongo Valley, California.

DESERT PROPERTY For Sale: Extra nice Desert Home only 10 min. from Palm Desert, midway between Palm Springs and Indio. \$5500—Brand new small house, never occupied, rough plumbing and electricity in, needs interior finish. Big concrete patios. Includes 5 acres. Terms. Acreage within a mile selling up to \$2,000 per acre. Write L. R. Waters, P. O. Box 582, or call Flreside 6-6101, Palm Desert, California.

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DESERT GARDEN HOMESITES near Desert Magazine. Large lots \$3000 up; 3 bedroom 2 bath homes \$23,500 up. Carl Henderson, agent, Box 201, Palm Desert. Flreside 6-6239.

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MISCELLANEOUS

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PROSPECTOR HAS 4-wheel drive '55 Jeep, pick-up truck coach on it, with \$150 monthly income. Want partner traveling companion with \$200 monthly income to prospect Nevada-Oregon-Utah country. Am 66 years of age, active. Frank Miller, 519 Quincy St., Bakersfield, California. References exchanged.

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DESIRE TO contact parties interested in purchasing bentonite clay. Sample if desired. T. Kanieski, 707 Terrace 49, Los Angeles 42, California.

May Revive Charcoal Industry . . .

CALIENTE—The Nevada Department of Economic Development is promoting the revival of Lincoln County's once prosperous charcoal industry. Feasibility of the project is based on a special survey recently completed by the Bureau of Land Management which shows that over 210,000 acres of pinyon and cedar are available for charcoal manufacturing. In the old days, charcoal was primarily used by the mining industry (*Desert*, June '56), but its present day market would be the growing number of backyard barbecue facilities, particularly in nearby California.—Reese River Reveille

• • • State Leads in Growth . . .

CARSON CITY—Nevada, ranked last in population among the 48 states, had a 60.1 percent increase in growth from 1950 to 1956, the Census Bureau reported. This was the highest percentage increase in the nation. The state's population in 1956 was 256,000. Nevada was followed in percentage growth by Arizona, 44.9 percent; Florida, 40.2 percent; Delaware, 31.4 percent; and California, 27.2 percent. —*Nevada State Journal*

Bighorn To Be Studied . . .

PINTWATER RANGE — Because of the Desert Game Range's nearness to the Frenchman Flat atomic test site, all bighorn sheep taken in this winter's hunt will be subjected to every known test to discover whether or not they show any effects of fallout. The refuge is only 20 miles from the test site. The Nevada Fish and Game Commission plans to issue 60 permits, each good for the taking of one old ram—animals with horns having three-quarters of a full curl or more. The Fish and Game people have a theory that the old rams are not increasing the bighorn race, and at the same time are keeping the young rams away from the ewes.—*Reese River Reveille*

Lake Mead Storage Up . . .

BOULDER CITY — Flow of the Colorado River through Grand Canyon for the water year October 1, 1956, through September 30, 1957, aggregated 17,490,000 acre feet. The U.S. Bureau of Reclamation's estimate for this period had been only 11,951,000 acre feet. Lake Mead had in storage on September 30, 1957, 21,522,000 acre feet, compared with 11,258,000 acre feet on April 19.—*Palo Verde Valley Times*

Muskats To Be Trapped . . .

FALON — A harvest of 9000 muskrats from the east side of the marsh in Stillwater Wildlife Management Area will be permitted this winter by the U.S. Fish and Wildlife Service. A permit under which the trapper will receive 75 percent of the revenue derived from the sale of pelts and the local Irrigation District 25 percent was issued.—*Nevada State Journal*

NEW MEXICO

Navajo Projects Praised . . .

WASHINGTON, D. C. — Indian Commissioner Glenn L. Emmons has commended the Navajos for using tribal funds for projects which the federal government normally would carry out. The Tribal Council recently appropriated \$575,700 for law and order facilities and a farm and range management program. Major law and order facilities will be built at Tuba City and Chinle, Arizona, and Shiprock, New Mexico; and small detention facilities are slated for Bitter Spring and Lupton, Arizona, and Tohatchi, New Mexico.—*New Mexican*

Historic Marker Shot Up . . .

SAN ANDREAS MOUNTAINS—A large historic marker sign erected at the grave of Eugene Manlove Rhodes, whose stories of New Mexico around the turn of the century are rated among the best Westerns ever

written, was riddled with bullet holes. State Tourist Bureau Director Wallace Barnes said thoughtless vandalism by trigger-happy hunters such as that which destroyed the grave marker, causes heavy expense to the state.—*New Mexican*

Winter Tourism Increasing . . .

SANTA FE — Resort and motel operators throughout New Mexico are reporting a less drastic slump during off-season months between the peak summer tourist seasons. Reasons for the increasing winter tourist business are more vacation time being enjoyed by most people; more money to spend on vacations; and the state's growing attraction for retired or semi-retired couples. The winter resorts are catering to the middle-aged and elderly who are not likely to be kept at home by children in school; and the ski enthusiasts.—*New Mexican*

Water Problem Study Asked . . .

LAS CRUCES—"Imagineering" is needed to solve the state's water problems, believes R. R. Aston of the Southspring Foundation. "The Problem is not only a problem of today but a problem of tomorrow. It will require not only engineering but imagination. It must be approached in a constructive and positive manner. Solution is not to be found in generalities and platitudes," he declared. Aston urged the state to undertake a complete water study, including an accurate inventory on its surface and underground water resources; an estimate of present and future water requirements and to outline a comprehensive and effective water conservation program. —*Las Cruces Citizen*

UTAH

Salt Shrimp Control Shifted . . .

SALT LAKE CITY—Control over Utah's salt shrimp industry will be shifted from the State Land Board to the State Fish and Game Commission. The little known industry supplies private and public aquariums and hatcheries throughout the nation with Great Salt Lake brine shrimp and shrimp eggs, rich sources of fish food.—*Salt Lake Tribune*

Ute Indians Block Highway . . .

TOWAOC, Colorado—Reluctance of the Ute Indians to provide right-of-way on their reservation was blamed for the delay of the Colorado Highway Commission's final decision regarding the location of a state road into the Four Corners oil region. Tentative plans call for a road to begin at Towaoc and pass through the Ute Reservation to the Utah state line. The Indians expressed fear that the high-

way would impair cattle grazing in the area, and also conflict with the plans of Montezuma County residents who are seeking state highway designation for the McElmo Canyon road. Meanwhile, engineers from the road commissions of Utah, Colorado, Arizona and New Mexico met to develop a network of roads linking the four states in the Four Corners area. Major needs are for a Utah road to tie onto the one Colorado plans to build; and a road to lead from Aneth across the San Juan River and south to Arizona.

Freeway Agreement Sought . . .

SALT LAKE CITY—Plans for a federal interstate highway from Salt Lake City to Las Vegas depend on agreement with Arizona over the southernmost link, the Utah Road Commission said. The route, following in the main U. S. Highway 91, cuts through extreme northwest Arizona.—*Nevada State Journal*

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Fred Harvey

Damsite Labor Trouble Told . . .

FLAMING GORGE — Hiring of employees by contractors at the Flaming Gorge damsite is causing concern, with the possibility that some labor organizations and civic groups may ask an investigation. Job seekers report they were told that they must first obtain clearance from unions in Salt Lake City, 225 miles from the damsite, before they would be hired. Most of the complaints are coming from Sweetwater County, Wyoming, where mining and railroad cutbacks have caused many men to seek work at the dam.—*Salt Lake Tribune*

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MINES and MINING

Window Rock, Arizona . . .

The Navajo Tribal Council will seek a one-sixth (16-2/3 percent) royalty on the entire 382,570 acres of oil and gas leases it will put up for bid this winter. More than 75 percent of the land is in San Juan County, Utah. Earlier the Council announced it only intended to lease lands around the Aneth and Rutherford pools in San Juan County for the one-sixth royalty. The remaining "wildcat" lands were to have been leased for the traditional one-eighth (12½ percent) royalty. However, in the formal advertisement for bid the Council announced that "the rate of royalty will be 16-2/3 percent on all leases."—*Dove Creek Press*

Paradise Valley, Nevada . . .

The famous National Mine in Paradise Valley, Nevada, has been re-opened, Welchel Mines Co. announced. In its heyday, the mine averaged \$30,000 per ton in gold and silver. Operations at the property ceased in 1941. The company said it will move in heavy equipment to drive a 300-foot tunnel around a cave-in area.—*Inland Empire Miner*

Washington, D. C. . .

"It is no longer in the interest of the government to expand production of uranium concentrate," Jesse C. Johnson, director of the AEC's Division of Raw Materials, recently declared. His statement was interpreted as meaning that the AEC will not approve any more mill construction contracts. Johnson went on to say that the search for new uranium supplies must continue on a broad scale "if we are to achieve the atomic power development anticipated in the next 10 to 20 years." The U.S. is producing uranium concentrate at the rate of about 10,000 tons a year and will increase this amount to 15,000 tons in 1959, he reported.—*Grants Beacon*

Dunphy, Nevada . . .

Scheduled to go into production was the Bootstrap Mine, 35 miles northeast of Dunphy in the southwest portion of Elko County. The mining property consists of a group of 20 adjoining lode claims and two placer claims. Ore is a rhyolite porphyry intrusion, with the recoverable value being gold. The owners said sufficient ore has been proven up to justify a small milling operation on the property.—*Battle Mountain Scout*

Barstow, California . . .

Kerr-McGee Oil Industries has leased 14,885 acres from Southern Pacific Land Co. preparatory to launching a full-scale search for saline deposits on the Mojave Desert. According to terms of the 25 year lease, Kerr-McGee has rights to salines and other evaporates only, including compounds of sodium, potassium and boron. Kerr-McGee is committed to drill the first test hole on or before June 1, 1960, and then continue drilling until one hole has been drilled on each of the 26 separate parcels involved in the deal. Each test hole is to go to basement, a depth of 200 feet, or to a deposit of saline ore. The company paid a cash rental of \$14,885 for the first year and will pay \$1 per year per acre rental thereafter. In addition, the land company will receive royalties on the sale of salines.—*Barstow Printer Review*

Grand Junction, Colorado . . .

The AEC is eliminating vanadium purchasing from all new contracts or extensions of contracts concerned with the milling of uranium-vanadium ores. Purchase of vanadium originally was launched to spur output of uranium, but only a few milling companies had vanadium sales contracts at time of the new AEC ruling.—*Dove Creek Press*

Santa Fe . . .

Discharges of chemical wastes from uranium mills into rivers must be controlled, declared Charles G. Caldwell, director of the Environmental Sanitation Services Division of the New Mexico State Health Department. Public health engineers from New Mexico, Arizona, Colorado and Utah are in agreement on this point, he added. The engineers plan to establish a co-ordinated program to monitor the amount of radio-activity in air samples and water supplies. —*Grants Beacon*

Lovelock, Nevada . . .

Mineral Materials Company has begun operation of its magnetic separation iron ore plant at the company's mine 30 miles east of Lovelock, on the west side of the Stillwater Range. Powerful magnets are used to remove the iron from the crushed ore. While most of the ore from the mine has been going to Japan, the company is striving to develop a domestic market.—*Humboldt Star*

Boron, California . . .

U. S. Borax and Chemical announced that its recently opened open pit mine and refinery at Boron will increase American production of boron by 30 percent. Approximately 70 percent of the free world's supply of this industrially and scientifically important ore will be produced through the new Mojave Desert project. Cost of the installation was set at \$20,000,000.—*Boron Enterprise*

• • •

Washington, D. C. . .

The Department of Interior disclosed that Federal financial participation in the search for some minerals under the Defense Minerals Exploration Administration Program has been reduced from 75 to 50 percent. Minerals affected include asbestos (chrysotile only), mercury, monazite and rare earths, platinum group metals, quartz crystals (piezoelectric), tantalum, thorium, tin, tungsten and uranium. Still eligible for 75 percent assistance are antimony, beryl, cobalt, manganese, mica (strategic), rutile-brookite, selenium and talc (block steatite). Other commodities eligible for 50 percent participation are bauxite, cadmium, chromium, copper, fluorspar, graphite (crucible flake), lead, molybdenum and zinc.—*Pioche Record*

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Grants, New Mexico . . .

Uranium ore reserves in the Ambrosia Lake area northwest of Grants have a value of at least \$1,250,000,000, estimated Clyde Osborn, chief metallurgist for Homestake-New Mexico Partners. He said that new discoveries are being made "every day" in the Grants area and when all five authorized uranium processing mills here are operating, the ore capacity will be 10,275 tons per day.—*Grants Beacon*

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Camp Verde, Arizona . . .

Verde Gypsum Co. is shipping agricultural gypsum from its \$250,000 mining development four miles east of Camp Verde. The material is being marketed in central Arizona.—*Verde Independent*

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Silver City, Nevada . . .

After two-and-a-half years of removing over-burden and milling the worthwhile ore during the process, Donovan Mining and Milling Co. has uncovered a large ore body which is running between \$10 and \$17 per ton in gold. The company estimates that there is 750,000 tons of this ore at the Silver City mine. Milling is by the Counter-Current Cyanide process which yields a mixture of gold and silver. The mill has been in operation for many years, handling low grade \$6 and \$7 a ton ore at a profit.—*Mason Valley News*

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Monument Valley, Utah . . .

The Chemical Engineering Achievement Award was presented to Vanadium Corporation of America for its development of a practicable process for extending the nation's supply of uranium by upgrading low-content ores. The company is using the process at its plant in Monument Valley which has a daily capacity of 500 tons of raw ore. The wet sand-slime process upgrades ores of uranium content well below that of economically-useable mill feed, as well as the AEC purchase minimum, to yield ores acceptable both for transportation and for mill feed.—*Salt Lake Tribune*

Ashfork, Arizona . . .

Plans to build a new cement plant at Ashfork were made public by the Arizona Portland Cement Company. Plant capacity will be 2,000,000 barrels a year and it will use the dry process method of manufacturing cement. Estimated cost of the project is \$12,000,000.

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Vernal, Utah . . .

Stauffer Chemical Co. and affiliated San Francisco Chemical Co. have scheduled exploitation of the largest single phosphate deposit in the Western Hemisphere, 15 miles north of Vernal. An estimated 700,000,000 tons of medium-grade phosphate rock—enough to supply all the needs of the United States at the present rate of consumption for more than 25 years—are contained in the vast lode. Suc-

cessful conversion of the deposit will depend on four factors which will determine the measure and speed with which the ore will be mined: economic mining of the rock; available electric power; carbon which must be utilized in electric furnace reduction of the rock; and regional transportation. —*Salt Lake Tribune*

• • •

Geneva, Utah . . .

U. S. Steel successfully completed a multi-million dollar program to control air pollution and emission of fluorides at its big Geneva Works. The program included research, installation of corrective equipment, claim settlement for damage to surrounding agriculture, and agricultural research. Ore from the mines in Iron County, Utah—unlike iron ore from Minnesota and other eastern sources—has a dangerously high fluoride content. The company has settled 880 claims brought against it, mostly by dairy farmers, amounting to \$4,450,234. —*Emery County Progress*

Paradox Basin, Four Corners Area

Geologists for a number of major and minor oil companies seem agreed on the probability that the Paradox Basin in the Four Corners Area—where Colorado, New Mexico, Arizona and Utah meet at a common point—is the location of a 500,000,000 barrel oil reserve. Estimated value of the oil is \$2,000,000,000. Over 35 seismograph crews employed by every major oil concern in the nation now are exploring the area. New strikes are certain to extend the basin's production, the geologists say. —*Pioche Record*

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Colada, Nevada . . .

Eagle-Picher Co. is planning to build a diatomaceous processing plant at Colada, six miles east of Lovelock. Company officials said that during the past five years many diatomaceous earth deposits have been explored, but the deposit in the Lovelock area is the largest and of the highest quality discovered in the past 30 years. The plant will be built on a 63-acre site on the Southern Pacific Railroad. —*Lovelock Review-Miner*

• • •

Washington, D. C. . .

The Atomic Energy Commission, in a move calculated to protect the public against possible radioactive accidents that might occur in the private shipment of fissionable materials, is proposing to limit the amounts of U-235, U-233 and plutonium that its licensees can haul at one time or offer for transportation to a private carrier. While no bomb-like explosions could result from mishaps in the transportation of these atomic materials, the AEC is moving to guard against accidental generation of radioactive waves which might occur if several individual containers of fissionable materials suddenly were brought together.

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AMATEUR GEM CUTTER

By DR. H. C. DAKE, Editor of The Mineralogist

In the final polish of some soft semi-precious gem minerals, oxalic acid appears to be of considerable aid. In the commercial polishing of large slabs of onyx, a high polish is obtained in a short time, attributed to the use of oxalic acid. The commercial method is as follows. A saturated solution of oxalic acid (one part acid to two parts water) is applied to the work using tin oxide as a final polishing agent. Oxalic acid, while poisonous, is not a violent poison, but should be used with due care.

* * *

The brand of sealing wax used by the writer in fastening small stones to the dops, is somewhat soft and sticky and does not always scrape off cleanly in the final cleaning of the stone. For removal of this wax from the stone, denatured alcohol has been used, but this dissolves the wax very slowly. Carbon tetrachloride will dissolve the top cement much faster and more effectively. Allow the stone to soak for a few minutes in the above liquid and the cementing wax will be completely dissolved.

* * *

Amethyst has long been used as a gem and when of good color is highly esteemed universally. For many years prior to the discovery of the large deposits of Brazil and Uruguay, amethyst was valued at a much higher price. It is surrounded with perhaps as much lore as any of the gems and in less enlightened ages many and varied were the powers ascribed to it. The name is derived from the Greek "amethystos" which means "not drunken."

This mineral occurs in well crystallized forms and seldom in a massive state. The color in amethyst crystals is usually deepest at the pyramidal termination and fades as the basal pinacoid is approached. Few large crystals have the color evenly distributed throughout, being most often spotted and streaked. In some crystals the color is in the form of a "core" in the center of the crystal. The color thus being unevenly distributed, it is necessary for the lapidary to consider these "color spots" in the crystal when cutting gems. The crystal should be cut so that the more densely colored area will be in the lower portion of the pavilion of the finished gem. This will aid in the dispersion of the color and give a uniform appearance to the color distribution, especially when the stone is viewed through the crown.

Since the index of the refraction of quartz is low, being 1.55 for the mean index, the critical angle will be high in value, hence the gem should be cut rather carefully to proper angles, if it is to appear at its best. This fact is true of any gem, but it is more obvious in gems with a low refractive index. The critical angle for amethyst is 40 degrees and 10 minutes, hence it should be cut with steep angles. The crown facets should be inclined to the girdle plain at an angle of 54 degrees, and the pavilion facets inclined to the same plane at 39 degrees. These values are based on a "brilliant" pattern and will necessarily vary with the design of the gem. If amethyst is cut too deep the effect will be a bright center with dull appearing edges. If cut too thin the gem will be brilliant at the edges but with a "dead" center. The effect of incorrect

cutting is at once obvious when a correct and an incorrectly cut stone are compared.

There are a number of varieties of manufactured materials on the market which are often used as an imitation for amethyst. The cheaper imitations being ordinary glass of a type of "strass" of the proper color. The better imitations, the kind commonly offered as "crystalline amethyst" are made of a high content quartz glass, colored with manganese or iron compounds. Air bubbles can often be seen in the fused imitation materials with a low powered magnifier or even the naked eye.

The dichroscope is perhaps the simplest and quickest means of determining genuine amethyst. The natural gem is dichroic even in the paler colors while the darker colors are distinctly so, while most of the imitations being amorphous are lacking in this property. Some fused carborundum will show dichroism, if cut in a certain manner, so it is advisable to run as a check test, a specific gravity determination. This can be easily accomplished with the mercuric and potassium iodide fluid, in which all fused carborundum will sink while all varieties of quartz will float. The twin colors of amethyst as seen under the dichroscope are bluish-purple and reddish-purple.

Amethyst which has been heat altered does not show dichroism as distinctly as the unaltered stones. In viewing a cut stone with the dichroscope it is often best to immerse the gem in some fluid with an index near that of the material being examined, in order to avoid the total reflection of light by the facets on the gem. Thus the gem can be viewed from all directions without encountering any total reflection. Oil of cloves is a satisfactory immersion fluid for amethyst.

* * *

The cause of color in amethyst has been a matter of much research work as well as speculation. The work of the late Edward F. Holden seemed to indicate that the color of amethyst was due to the presence of a ferric iron, while more recently the spectroscopic analysis made by Dr. George O. Wild indicates that the color is not due to iron or any other chemical compound, but to the structure of the material itself. Additional research work probably will shed further light on the cause of color in amethyst.

It is claimed that the color in some amethyst can be improved by proper pyro treatment. Most of this type of work is done in Germany and France. Little altering of gems on a commercial scale is done in America.

Large cut stones of amethyst over 10 carats in size of a dark color and the color evenly distributed, should be carefully scrutinized to determine if genuine and unaltered. The larger stones of dark and even color are not at all common, due to the fact that the color in natural crystals is usually uneven in its distribution. When

amethyst of large size of dark even color is offered at seemingly low prices, it is best to either carefully examine the stone or have it examined before making the purchase, as such gems are more or less rare and naturally bring a better price.

Any amethyst in which the color is unevenly distributed or streaked generally can be looked upon as genuine and unaltered without further examination. The dark but pyro-altered stone will show less dichroism than the unaltered stone. Any stone which has a dark and evenly distributed amethyst color and which is not distinctly dichroic can be confidently put down as a fraud or alteration of some type or other.

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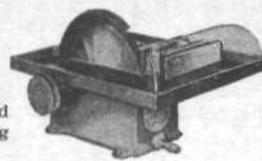


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GEMS AND MINERALS

ROCKHOUNDS TURNING TO LOCALITY COLLECTING

With marked increases in the rockhound fraternity and the resultant scarcity of the more prized gem specimens, more and more hobbyists who formerly concentrated on specific material collections (crystals, thumbnail specimens, quartz family, etc.) are turning to locality collecting. This is especially true of rockhounds who are determined to personally gather the specimens they place in their collections.

Locality collecting provides much enjoyment and an unequaled opportunity to thoroughly learn the geological and mineralogical history of a given area. Instead of taking a field trip for crystals, for instance, and returning home empty handed, a specific locality often will provide an almost endless variety of minerals. And when the minerals from a certain location all have been found, the rockhound can turn to improving the quality of each variety—or expanding his territory to a district-wide, county-wide or state-wide area.

Variations of a single mineral also can be gathered to further enhance one's collection and knowledge of the area. Within a few short years, the average hobbyist should amass a fine collection.—Jack Schwartz in the Montebello, California, Mineral and Lapidary Society's *The Braggin' Rock*

SHOP HINTS FOR THE AMATEUR LAPIDARY

In polishing aluminum and its alloys, apply kerosene to the buff before applying tripoli or rouge.

To rub smooth the high points of a gold article, use sodium-bicarbonate with the minimum of water.

Metal to marble cement: mix and apply, while hot, melted sulphur three parts, Portland cement one part, by weight.

A fast setting stone cement can be made by mixing the following ingredients: sodium-silicate (waterglass), 25 parts; slaked lime (calcium-hydroxide), five parts; powdered white lead, five parts; precipitated chalk, one part; add just enough water to make a manageable paste, and work fast.

By adding an ounce-and-a-half of amylo-acetate to each gallon of kerosene the latter becomes practically odorless and will burn without soot formation.—Ray Manderville in the Verdugo Hills, California, Gem and Mineral Society's *Rockhound News and Views*

CHANGING MERCURY TO GOLD WITH NEUTRONS DOESN'T PAY

Although it is an alchemist's dream come true, only a very small percentage of mercury can be converted to gold when bombarded with neutrons. This small percentage makes the conversion uneconomical.

Gold can be changed to mercury, too, the material so obtained being pure isotope 198 of mercury, which is difficult to produce by any other method. The length of the light waves emitted by the isotope 198 mercury lamp are of such an exact wave length that they are used by the National Bureau of Standards and elsewhere when exactness in measurements is paramount.—J. G. Ennes in the San Francisco Gem and Mineral Society's *The Mineralog*

To "grow" beautiful crystals place feathers, thin wires, screening, toothpicks, hair, or loose strands of silk in a boiling solution of one pound of mono-ammonium phosphate in a quart of water. Allow the articles to cool in the bath. The crystals can be colored with water soluble dyes.—*Rockhound News and Views*

GRINDING WHEEL BALANCED WITH SPRING-SET STONE

Here is a suggested method of removing bumps from a grinding wheel:

Glue a hard tough stone to an inch-long dowel and fasten a strong spring to the other end of the length of doweling. Cut another dowel and fasten it to the spring and grind the stone as you would any cab. The action of the spring will allow the stone to grind lightly on the low spots of the wheel, and harder on the high spots. If the wheel sides are true, a perfect balance can be put on a wheel in a few minutes.—*Pseudomorph*



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The new Gem and Mineral book has over 100 large size (six by seven inch) mineral pictures of excellent quality and showing much detail. Most are of crystals and other characteristic forms of the minerals.

The author, who is associate professor of Mineralogy and Petrography at Smith College, Northampton, Massachusetts, has compiled a representative group of photos

that are almost as useful for study purposes as actual specimens.

Published by the author; 109 illustrations with short descriptive text for each; spiral bound paper cover book; \$1.60. May be ordered from Desert Crafts Shop, Palm Desert, California. Please add 8 cents postage; California purchasers add four percent sales tax.

New officers of the Orange Coast Mineral and Lapidary Society of Costa Mesa, California, are Sabina Beal, president; Herb Routledge, vice president; Alice Fly, secretary; and Dick Burnette, treasurer.—*Orange Gulch Gazette*

HANDY ARIZONA GEM FIELD GUIDE IN SECOND PRINTING

Now available is the second edition of Alton Duke's *Arizona Gem Fields*. The useful guide to the state's best jasper-agate gem collecting fields has been enlarged and amended. Five gem locales have been added to the nearly 50 presented in the original printing.

Author Duke states that all of the fields described in the late 1956 first printing of his book have been re-checked and are still productive.

Every trip described in the book can be made by automobile and Duke tells how to get there, what supplies to bring and what to expect to find.

The book is purposely non-technical and is one every amateur gem collector who plans an Arizona outing should carry in his car glove compartment.

Published by the author; with maps and illustrations; 132 pages; paperback cover; \$2.50. May be ordered from Desert Crafts Shop, Palm Desert, California. Please add 8 cents for postage; California purchasers add four percent sales tax.

• • • NEWLY FALLEN METEORITES SELDOM HOT TO THE TOUCH

Contrary to popular opinion, meteorites are not extremely hot or flaming when they strike the ground. They do not make "glowing craters" or "burn for days." They have been out in space and are very cold—their flight of a few seconds through the atmosphere of the earth strips off most material which is heated, and the remnant which hits the ground will be solid and only mildly warm or actually cool to cold. They do not spatter on striking.

The only sign of "melting" on a meteorite is on its thin crust. Ordinarily rocks which have been lying in the sunshine for some hours are naturally quite hot and sometimes are mistaken for meteorites.

Meteorites never show gas bubble holes as does artificial slag, and are never frothy or honeycombed. They are always solid or compact. — Austin, Minnesota, Gem and Mineral Society's *Achates*

• • •
On your next field trip include one of the plastic squeeze bottles equipped with brush tops designed for dishwashing. It not only saves water on dishwashing, it can be used to wet rocks when you run out of saliva. One of the Windex-type bottles with spray tops are excellent for wetting sandpaper when sanding rocks.—*Mineral Messenger*

• • •
April 19-20 are the dates set for the second annual mineral and gem show to be sponsored by the Orange Coast Mineral and Lapidary Society of Costa Mesa, California. The show is scheduled for the Orange County Fairgrounds.

• • •
The Wichita, Kansas, Gem and Mineral Society has set April 26-27 dates for its next show. The event is scheduled to take place at the Kansas National Guard Armory at 3535 West Douglas St.—*Quarry Quips*

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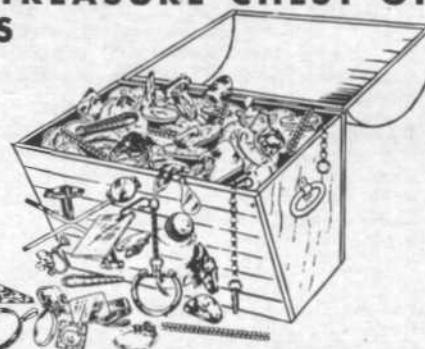
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ANSWERS TO DESERT QUIZ

Questions are on page 18

- 1—Apply a tourniquet.
- 2—Tombstone.
- 3—Smoke tree.
- 4—Outlaw.
- 5—Yuma.
- 6—Flower.
- 7—Panamint range.
- 8—Grinding seeds.
- 9—Superstition Mountains.
- 10—Manly.
- 11—Acoma Indians.
- 12—The odor of its foliage.
- 13—Flowering shrub.
- 14—Las Vegas.
- 15—Borax.
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- 17—Archeologist.
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- 19—Death Valley.
- 20—Sloping fan at the base of a desert range.

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GOLD QUARTZ specimens for sale. Extremely rich gold quartz from a producing Mother Lode mine. These specimens have been hand picked for their excellence as collectors' items. \$2 and up postpaid. Also fine quality gold nuggets \$2 and up. Dell Riebe, P.O. Box 46, Grass Valley, California.

MINERAL SET: 25 identified minerals—\$1.25 postpaid. Clyde R. Morron, George West, Texas.

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MISCELLANEOUS

A FORMER mineral dealer's personal collection is now available as a complete unit. Ideal for school, college or individual. 36 sectional drawer cabinet available. Inquiries invited. Charles F. Gritzer, 135 N. Surrine Street, Mesa, 3, Ariz.

Perfect crystals of pure iron have been developed which are 100 times stronger than any known metallic crystal. The crystals, which have an inherent resistance to rust, are metallic whiskers about one-thousandth of an inch thick and an inch or so long.—S.M.S. Matrix

• • •
New officers of the Coachella Valley Mineral Society of Coachella, California, are Ennis Scott, president; LeRoy Pawley, vice president; Mrs. Charlene Carney, secretary; Mrs. Erva Smith, treasurer; W. L. Stailey, Omar Kerschner and George Smith, directors; and Clifton Carney, federation director.—Coachella Valley Sun

"QUOTES"

FROM THE GEM AND MINERAL WORLD

"It's a wise man who profits by his own experience, but it's a good deal wiser one who lets the rattlesnake bite the other fellow."—Downey, California, Delvers Gem and Mineral Society's *Delvings*

* * *
"Had another birthday this week. Got to reflecting way back to wireless telegraph, my first horseless carriage, smokeless powder, wireless radio, and television, meatless Tuesdays, then noiseless typewriters and tubeless tires. Never thought I'd live to see stoneless hills created by heartless rockhounds."—The "Old Filosifer" in the Barstow, California, Mojave Desert Gem and Mineral Society's *Desert Diggins*'s

FOOL'S GOLD IS UNUSUALLY HARD SULPHIDE MINERAL

Pyrite is a common vein mineral, occurring in rocks of all ages and associated with many different minerals. It is widely distributed as an accessory rock mineral in both igneous and sedimentary rocks.

Rocks that contain pyrite are unsuitable for building purposes because of the ready oxidation of the pyrite which would disintegrate the rock and stain it with iron oxide. It often is mined for the gold or copper associated with it. Because of the large amount of sulphur present in the mineral, it is never used as an iron ore.

Most common crystal form of pyrite is the cube, the faces of which usually are striated. Recently it was discovered that this mineral generally is optically doubly refractive, giving off color combinations of red, green and orange.

Pyrite is brittle. It has a hardness of 6 to 6.5 — unusually hard for a sulphide. Luster is metallic, splendid; color pale brass yellow, becoming darker at times due to tarnish. Pyrite frequently is known as Fool's Gold.—Lucia Mehring in the Arrowhead Mineralogical Society's *Arrow Points*

CHIEF BUILDING MATERIAL OF ROME WAS TRAVERTINE

Travertine is a corruption of the word "Tiburtino" (Stone of Tibur) which was the principal building stone of Rome. Saint Peter's Cathedral and the outer walls of the Colosseum are built of travertine.

This material also is known as sinter—a word taken from the German and allied to the English word "cinder." It is applied to certain mineral deposits more or less porous or vesicular in texture.

There are at least two kinds of sinter—siliceous sinter known to mineralogists as geyserite; and calcareous sinter, a deposit of opaline or amorphous silica from hot springs and geysers occurring as an incrustation around the springs and forming conical mounds or terraces. Deposits in the open air form sinter-tile-travertine, those underground form stalagmites.—Contra Costa, California, Mineral and Gem Society's *Bulletin*

Here is a simple test to determine the genuineness of diamonds: merely touch the stone with a piece of solid carbon dioxide (dry ice). If you hear a squeak, the gem is real. Glass or paste produce no sound.—S.M.S. *Matrix*

FOR BEST RESULTS, JADE MUST BE POLISHED QUICKLY

Jade, in most cases, can easily be brought to a high polish by several methods. The exceptional piece is one that has soft areas that will pull or a tendency to "orange peel" when being worked. Unless such pieces have exceptional merit because of color or pattern, they should be discarded.

First step in successful jade polishing is thorough sanding. If using sanding paper or loose grits on close-grained soft wood, sand wet, using 220, 400 and 600 grits. The 600 grit sanding should be started wet and continued long enough to produce a smooth finish. Final sanding should be done on a worn 600 grit paper, run dry. Use considerable pressure and continue until the jade shows a semi-polish.

If rubber bonded wheels are used for sanding, finish on 600 grit as noted above. At this stage, the jade should have a semi-polish and be free—or practically free—of "orange peel." If pits are noticeable, sand dry with 600 grit on a hard backing—linoleum or wood is good, and heavy sheet cork on wood probably will work.

The actual polishing leaves considerable choice of materials and polishing compounds to choose from, but regardless of the method used, high speed and pressure are required, the object being to secure a high polish quickly, so that continued action of the polishing unit will not cause pitting.

Several polishing laps can be used: hard leather or ironing board or similar canvas over a convex wood disk (always use a hard backing); close-grained hard woods such as rock maple, gum, beech or poplar, with no covering; or muslin buffs run at 3500 r.p.m. for six and eight inch sizes and at motor speed for the 10 and 12 inch sizes. Since all of these laps are run between motor speed and 3500 r.p.m., it is a good idea to apply the polishing compound to the stone rather than to the polishing disk or buff, in order to avoid excess spattering and waste of polishing material.

Some prefer chrome oxide polishing powder on hard leather or canvas, while others use tin oxide on wood. There are a number of special jade polishing powders on the market. The addition of a small amount of Linde-A to either chrome or tin oxide will improve the results.—Gerald Hemrich in the Contra Costa, California, Mineral and Gem Society's *Bulletin*

Nickel is said to have been named after the devil. Often found in ores combined with copper, it was used in this natural alloy in ancient times. Miners in Saxony, attempting to smelt what they believed to be copper ore, came up with the white metal that was so hard it could not be hammered into useful objects. Thus they believed the devil had cast a spell over the ore. In the 18th Century, nickel was recognized as a separate element.—*Rock Hound News and Views*

To properly number specimens, first paint on a small spot of white enamel and let dry for a day or two. Then with a non-washable ink, carefully pen your code number on the spot. Use a sharp pen point.—*News Nuggets*

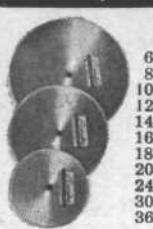
The cutting of bamboo dulls woodworking tools quicker than any other wood. This is due to the silicon absorbed by the bamboo from the soil.—*The Mineralog*

Covington DIAMOND BLADES

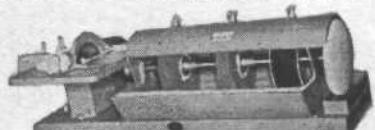
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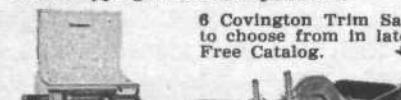
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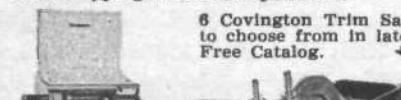
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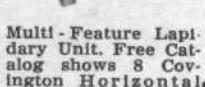
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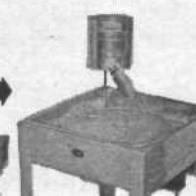
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By RANDALL HENDERSON

THESE ARE changing days for the American Indians as well as for white Americans. Within recent months the Indian Bureau in Washington has appointed a former consultant from the National Association of Manufacturers to encourage industrial concerns to locate new plants on or near the Indian reservations in order to provide employment opportunities for the Indians.

Industrialize the Indians! I think I know what will be the reaction of many readers to that idea. They won't like it. They would prefer to regard the native tribesmen as symbols of a free and simple way of life which has been lost to most of us in this age of hurry and hustle. But we still like to dream about it.

I didn't like it either, when I first felt the impact of this new program. But I realize that it has to come, for the native redskins of America have the same genetic endowment of intelligence as do we of the white race. They want a higher standard of living. They want their children to have more education. They do not want to be regarded as an inferior group, occupying islands of primitive culture in a civilization which is changing and growing—at least in material advantages.

Their lands are too arid—at least in the Southwest where the greater portion of the Indian population is confined to reservations—for them ever to attain a high standard of living as farmers or herdsmen. The white man's factories are making it more and more difficult for them to earn decent wages as handcraftsmen.

The only road open to them appears to be in the direction of industrialization. And if that is true, then it is better that small and medium-sized factories be brought to their own homeland, than that they be dispersed to industrial plants in distant cities. The placement office of the Indian Bureau is working diligently to help Indian workmen who leave the reservation for distant factory jobs, adjust to the new environment—and yet for the Indian families involved, their problems would be much simpler if the same work was available close to the traditional lands of their own people.

The problem of adjusting to an industrial world is not confined alone to the Indians of America. In India and China and other countries of Asia and Africa the native population faces the same problem—the change from a primitive agrarian life to an industrial economy. Progress being what it is in this world of man's manipulation, the change-over seems inevitable. Perhaps—and we hope this will be true—the native tribesmen will be able to bring to the harsh materialism of our industrialized culture some of the spiritual elements of beauty and faith and humility which are the inherent endowment of those who for countless generations have lived close to the good earth.

* * *

As this is written, early in December, my date-growing neighbors in Coachella Valley are picking and packaging a bountiful harvest of what I think is the most delicious food grown on trees—for shipment to every part of the United States.

Most confections are an artificial combination of sugar and other ingredients, made up in attractive form to please the eye and the palate. Unfortunately, they also will create unattractive waistlines, if eaten in any quantity.

But dates are different. Somehow, Mother Nature has combined her sunshine and water and other natural elements into a sweetmeat that is both delightful to the palate and good tonic for the body. And I can vouch for the cleanliness with which the fruit is handled in our American packing sheds.

In contrast, I recall the days of my Air Force service on the Sahara Desert during World War II. Dates were being grown there long before the first offshoots were brought to the United States. But the Arabs still harvest and process them by the same unsanitary methods of their forefathers. On the oasis of Atar were over 30,000 date palms—all native seedlings. At harvest time the nomads moved in from the desert, set up their black tents under the palm trees, and gathered the fruit. The harvest consisted of sending a young son or daughter up into the tree to shake the fruit stems while the women with baskets gathered the dates where they fell on the sand. Sterilizing processes such as all Coachella Valley dates go through, were unknown at Atar. The fruit merely was stuffed in goatskin bags for the day when it would be eaten, and if there was a little sand or a few bugs mixed with the fruit it mattered not.

Dates and goat milk were the main items of diet at Atar. And I am sure dates are not fattening for I never saw a fat Arab, except the chief, and I suspect he had access to some European luxuries not available for his tribesmen.

* * *

I do not know where our mockingbird spends the summer, but it has returned again this season to delight Cyria and I with its song. Perched on the top of a nearby pole it trills and warbles and chirps and croons a range of melodies that are joyous and heart-warming. The mockingbird—nearly all birds—seem to have a special gift for gladness. As Professor N. J. Merrill once wrote: "To be a bird is to be alive more intensely than any other living creature, man included. Birds have hotter blood, brighter colors, stronger emotions. . . . They are not very intelligent . . . (but) they live in a world that is always the present, and mostly full of joy."

BOOKS of the SOUTHWEST

NEW BOOK OF LOST GOLD AND TREASURE TALES

Tales of the legendary lost gold and treasure caches in the West may change, but they never fade out. New elements of mystery appear in each retelling—and the truth . . . well, who can say what element of truth there may be in a treasure story that has been retold ten thousand times, as is true of such mysteries as the Pegleg black gold or the Breyfogle silver.

Newest collection of lost treasure yarns is the book *Lost Mines and Hidden Treasure* written by Leland Lovelace.

The author's tales include many of the well known stories that have been in circulation for 50 years or longer, and others that have not been so widely circulated. It is fortunate, perhaps, for modern day writers that the plot of a lost-mine story cannot be copyrighted — nor can the English language.

This is fortunate because there are people — many people — who like to read these tales and dream of the wealth that might be theirs if they were fortunate enough to find the gold, or the treasure, that had defied all other fortune-hunters for a half century or more. And even if they embark on an expedition that requires time and a grub-stake, who can say that days spent roaming over the hills and the peaceful evenings beside a campfire in some remote canyon are time and money wasted? For after all, it is the experience and not the gold

one acquires in a life-time that really matters.

Author Lovelace has told his stories well. And the fact that they are many times retold tales will perhaps add rather than detract from their interest for those who dream of easy wealth.

Published by The Naylor Company, San Antonio, Texas. 252 pp. \$4.00.

LYMAN'S BOOK ON ROARING COMSTOCK BOOM REPRINTED

To read George D. Lyman's *The Saga of the Comstock Lode* is to relive in fancy an adventure the West probably never again will witness. Written in a unique style that reflects the bravado of men standing shoulder to shoulder against the harsh new land, Dr. Lyman's book is a vivid and fast moving appraisal of the roaring early West.

Here is the buoyant and virile young life of the Virginia City, Nevada, mining camp which during its relatively short life yielded \$600,000,000 in gold and \$500,000,000 in silver—impressive figures even in this age of unfathomable government budgets. But, the book is more than the story of one Western bonanza town—it is in a deeper sense the story of all towns founded on wealth that can be irreplaceably extracted, wealth that can not reproduce itself as can cattle and grain.

And in this volume we gain a better understanding of the young men who created these camps, developed them and then moved on to new El Dorados. They were men like those living today —except for them El Dorado was a real thing, always near at hand. Finding a million dollars by walking up the right canyon—or missing a million by walking down the wrong canyon, does not make for a stable society.

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